

Bibliography

- Abdalati, W., and K. Steffen. 1995. Passive microwave-derived snow melt regions on the Greenland ice sheet. *Geophysical Research Letters* 22 (7):787–790.
- . 1998. Accumulation and hoar frost effects on microwave emission on the Greenland ice-sheet dry-snow zones. *Journal of Glaciology* 44 (148):523–531.
- Ackerman, S.A., K.I. Strabala, P.W.P. Menzel, R.A. Frey, C.C. Moeller, and L.E. Gumley. 1998. Discriminating clear sky from clouds with MODIS. *Journal of Geophysical Research* 103 (D24):32141–32157.
- Adalgeirsdóttir, G., K. Echelmeyer, and W.D. Harrison. 1998. Elevation and volume changes on the Harding Icefield, Alaska. *Journal of Glaciology* 44 (148):570–582.
- Ahlnäs, K., C.S. Lingle, W.D. Harrison, T.A. Heinrichs, and K.A. Echelmeyer. 1992. Identification of late-summer snow lines on glaciers in Alaska and the Yukon Territory with ERS-1 SAR imagery (abstract). *EOS Transactions* 73 (43):204.
- Albertz, J., and K. Zelianeos. 1990. Enhancement of satellite image data by data cumulation. *Journal of Photogrammetry and Remote Sensing* 45 (3):161–174.
- Alley, R.B. 1995. Resolved: the Arctic controls global climate change. In *Arctic Oceanography: Marginal Ice Zones and Continental Shelves*, edited by W.O. Smith and J.M. Grebmeier. Washington DC: American Geophysical Union.
- Alley, R.B., C.A. Shuman, D.A. Meese, A.J. Gow, K.C. Taylor, K.M. Cuffey, J.J. Fitzpatrick, G. Spinelli, G.A. Zielinski, M. Ram, P.M. Grootes, and B. Elder. 1997. Visualising stratigraphic dating of the Greenland Ice Sheet Project 2 (GISP2) ice core: Basis, reproducibility, and application. *Journal of Geophysical Research* 102:26367–26381.
- Andersen, T. 1982. Operational snow mapping by satellites. Paper read at Hydrological Aspects of Alpine and High Mountain Areas, at Exeter, U.K.
- Andreassen, L.M., H. Elvehøy, and B. Kjøllmoen. 2002. Using aerial photography to study glacier changes in Norway. *Annals of Glaciology* 34:343–348.
- Aniya, M., H. Sato, R. Naruse, P. Skvarca, and G. Casassa. 1996. The use of satellite and airborne imagery to inventory outlet glaciers of the southern Patagonia icefield, South America. *Photogrammetric Engineering and Remote Sensing* 62 (12):1361–1369.
- Annan, A.P., and J.L. Davis. 1977. Impulse radar applied to ice thickness measurements and freshwater bathymetry. *Geological Society of Canada papers* 77-1B:63–65.
- Archer, D.R., J.O. Bailey, E.C. Barrett, and D. Greenhill. 1994. The potential of satellite remote-sensing of snow over Great Britain in relation to cloud cover. *Nordic Hydrology* 25 (1–2):39–52.
- Arcone, S.A., and A.J. Delaney. 1987. Airborne river-ice thickness profiling with helicopter-borne UHF short-pulse radar. *Journal of Glaciology* 33 (115):330–340.
- Arcone, S.A., A.J. Delaney, and D.J. Calkins. 1989. Water detection in the coastal plains of the Arctic National Wildlife Refuge using helicopter-borne short-pulse radar. Hanover, NH: U.S. Army Cold Regions Research and Engineering Laboratory.

- (Argentina), Servicio Meteorológico Nacional. 1992. Monitoring of a drifting iceberg in the South Atlantic. *Marine Observer* 62 (317):130–134.
- Armstrong, R.L. 1985. Metamorphism in a subfreezing, seasonal snow cover: the role of thermal and vapor pressure conditions. PhD, University of Colorado, Boulder.
- Armstrong, R.L., and M.J. Brodzik. 2002. Hemispheric-scale comparison and evaluation of passive-microwave snow algorithms. *Annals of Glaciology* 34:38–44.
- Armstrong, R.L., A. Chang, A. Rango, and E. Josberger. 1993. Snow depths and grain-size relationships with relevance for passive microwave studies. *Annals of Glaciology* 17:171–176.
- Avery, T.E., and G.L. Berlin. 1992. *Fundamentals of Remote Sensing and Airphoto Interpretation*, 5th ed. New York: Macmillan Publishing Company.
- Baghdadi, N., J-P. Fortin, and M. Bernier. 1999. Accuracy of wet snow mapping using simulated Radarsat backscattering coefficients from observed snow cover characteristics. *International Journal of Remote Sensing* 20 (10):2049–2068.
- Baghdadi, N., Y. Gauthier, and M. Bernier. 1997. Capability of multitemporal ERS-1 SAR data for wet-snow mapping. *Remote Sensing of Environment* 60 (2):174–186.
- Baghdadi, N., C.E. Livingstone, and M. Bernier. 1998. Airborne C-band SAR measurements of wet snow-covered areas. *IEEE Transactions on Geoscience and Remote Sensing* 36 (6):1977–1981.
- Bamber, J.L. 1994. Ice sheet altimeter processing scheme. *International Journal of Remote Sensing* 15 (4):925–938.
- Bamber, J.L., and C.R. Bentley. 1994. A comparison of satellite altimetry and ice-thickness measurements of the Ross Ice Shelf, Antarctica. *Annals of Glaciology* 20:357–364.
- Bamber, J.L., and R.A. Bindschadler. 1997. An improved elevation dataset for climate and ice-sheet modelling: validation with satellite imagery. *Annals of Glaciology* 25:439–444.
- Bamber, J.L., and J.A. Dowdeswell. 1990. Remote-sensing studies of Kvitoyjokulen, an ice cap on Kvitoya, north-east Svalbard. *Journal of Glaciology* 36 (122):75–81.
- Bamber, J.L., S. Ekholm, and W. Krabill. 1998. The accuracy of satellite radar altimeter data over the Greenland ice sheet. *Geophysical Research Letters* 25 (16):3177–3180.
- Bamber, J.L., and A.R. Harris. 1994. The atmospheric correction for satellite infrared radiometer data in polar regions. *Geophysical Research Letters* 21 (19):2111–2114.
- Bamber, J.L., R.L. Layberry, and S.P. Gogineni. 2001a. A new ice thickness and bed data set for the Greenland ice sheet. 1. Measurement, data reduction, and errors. *Journal of Geophysical Research* 106 (D24):33773–33780.
- . 2001b. A new ice thickness and bed data set for the Greenland ice sheet. 2. Relationship between dynamics and basal topography. *Journal of Geophysical Research* 106 (D24):33781–33788.
- Baral, D.J., and R.P. Gupta. 1997. Integration of satellite sensor data with DEM for the study of snow cover distribution and depletion pattern. *International Journal of Remote Sensing* 18 (18):3889–3894.
- Barber, D.G., and E.F. LeDrew. 1994. On the links between microwave and solar wavelength interactions with snow-covered first-year sea ice. *Arctic* 47:298–309.

- Barber, D.G., T.N. Papakyriakou, and E.F. LeDrew. 1994. On the relationship between energy fluxes, dielectric properties, and microwave scattering over snow covered first-year sea ice during the spring transition period. *Journal of Geophysical Research* 99:22401–22411.
- Barber, D.G., T.N. Papakyriakou, E.F. LeDrew, and M.E. Shokr. 1995. An examination of the relation between the spring period evolution of the scattering coefficient σ^0 and radiative fluxes over landfast sea-ice. *International Journal of Remote Sensing* 16:3343–3363.
- Bardel, P., A.G. Fountain, D.K. Hall, and R. Kwok. 2002. Synthetic aperture radar detection of the snowline on Commonwealth and Howard Glaciers, Taylor Valley, Antarctica. *Annals of Glaciology* 34:177–183.
- Barnett, T.P., L. Dümenil, U. Schlese, E. Roeckner, and M. Latif. 1989. The effect of Eurasian snow cover on regional and global climatic variations. *Journal of Atmospheric Science* 46 (5):661–685.
- Barton, I.J., A.M. Zavody, D.M. O'Brien, D.R. Cutten, R.W. Saunders, and D.T. Llewellyn-Jones. 1989. Theoretical algorithms for satellite-derived sea surface temperatures. *Journal of Geophysical Research* 94 (D3):3365–3375.
- Basist, A., and N.C. Grody. 1994. Identification of snowcover, using SSM/I measurements. Paper read at American Meteorological Society: Sixth Conference on Climatic Variations, at Nashville.
- Bauer, P., and N. Grody. 1995. The potential of combining SSM/I and SSMT/2 measurements to improve the identification of snow cover and precipitation. *IEEE Transactions on Geoscience and Remote Sensing* 33:252–261.
- Baumgartner, M.F., and G. Apfl. 1993. Alpine snow cover analysis system. Paper read at Sixth AVHRR Data Users' Meeting, at Belgrate.
- Baumgartner, M.F., G. Apfl, and T. Holzer. 1994. Monitoring Alpine snow cover variations using NOAA-AVHRR data. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- Baxter, J.P. 1991. Soviet satellite imagery: the photographic alternative to digital remote sensing data. *Mapping Awareness* 5:30–33.
- Bayr, K., D.K. Hall, and W.M. Kovalick. 1994. Observations on glaciers in the eastern Austrian Alps using satellite data. *International Journal of Remote Sensing* 15 (9):1733–1742.
- Beaven, S.G., S.P. Gogineni, S. Tjuatja, and A.K. Fung. 1997. Model-based interpretation of ERS-1 SAR images of Arctic sea ice. *International Journal of Remote Sensing* 18 (12):2483–2503.
- Beltaos, S., D.J. Calkins, L.W. Gatto, T.D. Prowse, S. Reedyk, G.J. Scrimgeour, and S.P. Wilkins. 1993. Physical effects of river ice. In *Environmental Aspects of River Ice*, edited by T.D. Prowse and N.C. Gridley. Saskatoon: National Hydrology Research Institute, Canada.
- Beltrami, H., and A.E. Taylor. 1994. Records of climatic change in the Canadian Arctic: combination of geothermal and oxygen isotope data yields high resolution ground temperature histories. *EOS Transactions* 75 (44):75.
- Benson, C.S. 1961. Stratigraphic studies in the snow and firn of the Greenland Ice Sheet. *Folia Geographica Danica* 9:13–37.
- Bindschadler, R. 1998. Monitoring ice sheet behavior from space. *Reviews of Geophysics* 36 (1):79–104.

- Bindschadler, R., M. Fahnestock, and R. Kwok. 1992. Monitoring of the Greenland ice sheet using ERS-1 synthetic aperture radar imagery. Paper read at Space at the Service of our Environment: First ERS-1 Symposium, at Cannes.
- Bindschadler, R., T.A. Scambos, H. Rott, P. Skvarca, and P. Vornberger. 2002. Ice dolines on Larsen Ice Shelf, Antarctica. *Annals of Glaciology* 34:283–290.
- Bindschadler, R.A., K.C. Jezek, and J. Crawford. 1987. Glaciological investigations using the Synthetic Aperture Radar imaging system. *Annals of Glaciology* 9:11–19.
- Bindschadler, R.A., and P.L. Vornberger. 1990. AVHRR imagery reveals Antarctic ice dynamics. *EOS Transactions* 71 (23):741–742.
- . 1992. Interpretation of SAR imagery of the Greenland ice sheet using coregistered TM imagery. *Remote Sensing of Environment* 42 (3):167–175.
- . 1994. Detailed elevation map of ice stream C using satellite imagery and airborne radar. *Annals of Glaciology* 20:327–335.
- Bingham, A.W., and W.G. Rees. 1999. Construction of a high-resolution DEM of an Arctic ice cap using shape-from-shading. *International Journal of Remote Sensing* 20 (15–16):3231–3242.
- Bishop, M.P., J.F. Shroder, B.L. Hickman, and L. Copland. 1998. Scale-dependent analysis of satellite imagery for characterization of glacier surfaces in the Karakoram Himalaya. *Geomorphology* 21 (3–4):217–232.
- Bjørge, E., O.M. Johannessen, and M.W. Miles. 1997. Analysis of merged SMMR-SSMI time series of Arctic and Antarctic sea ice parameters 1978–1995. *Geophysical Research Letters* 24 (4):413–416.
- Bobylev, L.P., K.Y. Kondratyev, and O.M. Johannessen, eds. 2003. *Arctic Environment Variability in the Context of Global Change*. Chichester: Springer-Praxis.
- Bochert, A. 1999. Airborne line scanner measurements for ERS-1 SAR interpretation of sea ice. *International Journal of Remote Sensing* 20 (2):329–348.
- Bogorodsky, V.V., C.R. Bentley, and P. Gudmandsen. 1985. *Radioglaciology*. Dordrecht: Reidel.
- Borodulin, V.V. 1989. Use of radar images from the Kosmos-1500 and -1766 satellites to describe ice conditions on inland bodies of water. [Ispol'zovaniye radiolokatsionnykh snimkov s ISZ "Kosmos-1500, 1766" dlya kharakteristiki ledovoy obstanovki na vnutrennikh vodoyemakh.] *Soviet Meteorology and Hydrology* 5:70–74.
- Borodulin, V.V., and V.G. Prokacheva. 1983. Studying lake ice regimes by remote sensing methods. Paper read at Hydrological Applications of Remote Sensing and Remote Data Transmission, 1985, at Hamburg.
- Bourdelles, B., and M. Fily. 1993. Snow grain-size determination from Landsat imagery over Terre Adélie, Antarctica. *Annals of Glaciology* 17:86–92.
- Braun, M., F. Rau, H. Saurer, and H. Gossmann. 2000. Development of radar glacier zones on the King George Island ice cap, Antarctica, during austral summer 1996/97 as observed in ERS-2 SAR data. *Annals of Glaciology* 31:357–363.
- Brenner, A.C., R.A. Bindschadler, R.H. Thomas, and H.J. Zwally. 1983. Slope-induced errors in radar altimetry over continental ice sheets. *Journal of Geophysical Research* 88:1617–1623.
- Bromwich, D.H., T.R. Parish, and C.A. Zorman. 1990. The confluence zone of the intense katabatic winds at Terra Nova Bay, Antarctica, as derived from airborne sastrugi surveys and mesoscale numerical modeling. *Journal of Geophysical Research* 95 (D5):5495–5509.

- Brown, I.A., M.P. Kirkbride, and R.A. Vaughan. 1999. Find the firn line! The suitability of ERS-1 and ERS-2 SAR data for the analysis of glacier facies on Icelandic icecaps. *International Journal of Remote Sensing* 20 (15):3217–3230.
- Brown, J., O.J. Ferrians, J.A. Heginbottom, and E.S. Melnikov. 1998. *Circum-arctic map of permafrost and ground-ice conditions*. National Snow and Ice Data Center/World Data Center for Glaciology 1998 (cited 26 May 2004). Available from <http://nsidc.org/data/ggd318.html>.
- Brown, R.D. 2000. Northern hemisphere snow cover variability and change. *Journal of Climate* 13:2339–2355.
- Brown, R.D., and R.O. Braaten. 1998. Spatial and temporal variability of Canadian snow depths 1946–1995. *Atmosphere and Ocean* 36 (1):37–54.
- Bryan, M.L., and R.W. Larson. 1975. The study of freshwater lake ice using multiplexed imaging radar. *Journal of Glaciology* 14 (72):445–457.
- Budd, W.F. 1970. Ice flow over bedrock perturbations. *Journal of Glaciology* 9 (55):29–48.
- Budyko, M.I. 1966. Polar ice and climate. Paper read at Symposium on the Arctic Heat Budget and Atmospheric Circulation, at Santa Monica.
- Burakov, D.A., and others. 1996. A technique for determining snow cover of a river basin from satellite data for operational runoff forecasts. [Metodika opredeleniya zasnezhennosti rechnogo basseyna po sputnikovym dannym dlya operativnykh prognozov stoka.] *Russian Meteorology and Hydrology* 8:58–65.
- Burns, B.A., D.J. Cavalieri, M.R. Keller, W.J. Campbell, T.C. Grenfell, G.A. Maykut, and P. Gloersen. 1987. Multisensor comparison of ice concentration estimates in the marginal ice zone. *Journal of Geophysical Research* 92 (C7):6843–6856.
- Campbell, J.B. 1996. *Introduction to Remote Sensing*, 2nd ed. London: Taylor and Francis.
- Campbell, W.J., W.F. Weeks, R.O. Ramseier, and P. Gloersen. 1975. Geophysical studies of floating ice by remote sensing. *Journal of Glaciology* 15 (73):305–328.
- Campbell, W.J., P. Gloersen, E.G. Josberger, O.M. Johannessen, P.S. Guest, N. Mognard, R. Shuchman, B.A. Burns, N. Lannelongue, and K.L. Davidson. 1987. Variations of mesoscale and large-scale ice morphology in the 1984 marginal ice-zone experiment as observed by microwave remote-sensing. *Journal of Geophysical Research — Oceans* 92 (C7):6805–6824.
- Carroll, S.S., and T.R. Carroll. 1989. Effect of uneven snow cover on airborne snow water equivalent estimates obtained by measuring terrestrial gamma radiation. *Water Resource Research* 25 (7):101–115.
- Carsey, F.D., R.G. Barry, and W.F. Weeks. 1992. Introduction. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Casassa, G., K. Smith, A. Rivera, J. Araos, M. Schnirich, and C. Schneider. 2002. Inventory of glaciers in isla Riesco, Patagonia, Chile, based on aerial photography and satellite imagery. *Annals of Glaciology* 34:373–378.
- Casassa, G., and J. Turner. 1991. Dynamics of the Ross Ice Shelf. *Eos* 72 (44):473–481.
- Cavalieri, D.J., J.P. Crawford, M.R. Drinkwater, D.T. Eppler, L.D. Farmer, R.R. Jentz, and C.C. Wackerman. 1991. Aircraft active and passive microwave validation of sea ice concentration from the Defense Meteorological Satellite Program Special Sensor Microwave Imager. *Journal of Geophysical Research* 96:21989–22008.

- Cavalieri, D.J., P. Gloersen, and W.J. Campbell. 1984. Determination of sea ice parameters with the Nimbus-7 SMMR. *Journal of Geophysical Research* 89:5355-5369.
- Cavalieri, D.J., C.L. Parkinson, P. Gloersen, J.C. Comiso, and H.J. Zwally. 1999. Deriving long-term time series of sea ice cover from satellite passive-microwave multisensor data sets. *Journal of Geophysical Research* 104 (C7):15803-15814.
- Chacho, E.F., S.A. Arcone, and A.J. Delaney. 1992. Location and detection of winter water supplies on the north slope of Alaska. Paper read at 43rd Arctic Science Conference, at Valdez, Alaska.
- Chang, A.T.C., and L.S. Chiu. 1991. Satellite estimation of snow water equivalent: classification of physiographic regimes. Paper read at IGARSS '91: International Geoscience and Remote Sensing Symposium: Global Monitoring for Earth Management, at Espoo, Finland.
- . 1990. Satellite sensor estimates of Northern Hemisphere snow volume. *International Journal of Remote Sensing* 11 (1):167-171.
- Chang, A.T.C., J.L. Foster, and D.K. Hall. 1987. Nimbus-7 SMMR derived global snow cover parameters. *Annals of Glaciology* 9:39-44.
- Chang, A.T.C., J.L. Foster, D.K. Hall, A. Rango, and B.K. Hartline. 1981. Snow water equivalent determination by microwave radiometry. In *NASA Technical Memoranda*. Greenfield, Maryland: NASA Goddard Space Flight Center.
- Chang, A.T.C., and L. Tsang. 1992. A neural network approach to inversion of snow water equivalent from passive microwave measurements. *Nordic Hydrology* 23 (3):173-182.
- Chang, T.C., P. Gloersen, T. Schmugge, T.T. Wilheit, and H.J. Zwally. 1976. Microwave emission from snow and glacier ice. *Journal of Glaciology* 16 (74):23-39.
- Chase, J.R., and R.J. Holyer. 1990. Estimation of sea ice type and concentration by linear unmixing of Geosat altimeter waveforms. *Journal of Geophysical Research* 95 (C10):18015-18025.
- Choi, E.M. 1999. The Radarsat Antarctic mapping mission. *IEEE Aerospace Electronics Systems Magazine* 14 (5):3-5.
- Choudhury, B.J., and A.T.C. Chang. 1979. Two-stream theory of reflectance of snow. *IEEE Transactions on Geoscience Electronics* GE17:63-68.
- Christensen, E.L., N. Reeh, R. Forsberg, J.H. Jørgensen, N. Skou, and K. Woelders. 2000. A low-cost glacier-mapping system. *Journal of Glaciology* 46 (154):531-537.
- Cline, D.W. 1993. Measuring alpine snow depths by digital photogrammetry. Part 1. Conjugate point identification. Paper read at Eastern Snow Conference, at Quebec.
- Cline, D.W., R.C. Bales, and J. Dozier. 1998. Estimating the spatial distribution of snow in mountain basins using remote sensing and energy balance modeling. *Water Resources Research* 34 (5):1275-1285.
- Colby, J.D. 1991. Topographic normalisation in rugged terrain. *Photogrammetric Engineering and Remote Sensing* 57 (5):531-537.
- Collins, M.J., and W.J. Emery. 1988. A computational method for estimating sea ice motion in sequential Seasat synthetic aperture radar imagery by matched filtering. *Journal of Geophysical Research* 93 (C8):9241-9251.

- Collins, M.J., C.E. Livingstone, and R.K. Raney. 1997. Discrimination of sea ice in the Labrador marginal ice zone from synthetic aperture radar image texture. *International Journal of Remote Sensing* 18 (3):535–571.
- Comiso, J. 1990. Arctic multiyear ice classification and summer ice cover using passive microwave satellite data. *Journal of Geophysical Research* 95:13411–13422.
- . 2002. Correlation and trend studies of the sea-ice cover and surface temperatures in the Arctic. *Annals of Glaciology* 34:420–428.
- Comiso, J.C. 1983. Sea ice effective microwave emissivities from satellite passive microwave and infrared observations. *Journal of Geophysical Research* 88 (C12):7686–7704.
- . 2000. Variability and trends in Antarctic surface temperatures from in situ and satellite infrared measurements. *Journal of Climate* 13 (10):1674–1696.
- Comiso, J.C., D.J. Cavalieri, C.L. Parkinson, and P. Gloersen. 1997. Passive microwave algorithms for sea ice concentration: a comparison of two techniques. *Remote Sensing of Environment* 60 (3):357–384.
- Comiso, J.C., P. Wadhams, W.B. Krabill, R.N. Swift, J.P. Crawford, and W.B. Tucker. 1991. Top bottom multisensor remote-sensing of Arctic sea ice. *Journal of Geophysical Research — Oceans* 96 (C2):2693–2709.
- Cooper, D.W., R.A. Mueller, and R.J. Schertler. 1976. Remote profiling of lake ice using an S-band short-pulse radar aboard an all-terrain vehicle. *Radio Science* 11:375–381.
- Cracknell, A.P., and L.W.B. Hayes. 1991. *Introduction to Remote Sensing*. London: Taylor and Francis.
- Cumming, W. 1952. The dielectric properties of ice and snow at 3.2 cm. *Journal of Applied Physics* 23:768–773.
- Dahl, J.B., and H. Ødegaard. 1970. Areal measurement of water equivalents of snow deposits by means of natural radioactivity in the ground. Paper read at Symposium on Isotope Hydrology, at Vienna.
- Dammert, P.B.G., M. Leppäranta, and J. Askne. 1998. SAR interferometry over Baltic Sea ice. *International Journal of Remote Sensing* 19 (16):3019–3037.
- Das, S.B., R.B. Alley, D.B. Reusch, and C.A. Shuman. 2002. Temperature variability at Siple Dome, West Antarctica, derived from ECMWF re-analyses, SSM/I and SMMR brightness temperatures and AWS records. *Annals of Glaciology* 34:106–112.
- Dash, M.K., S.M. Bhandari, N.K. Vyas, N. Khare, A. Mitra, and P.C. Pandey. 2001. Oceansat-MSMR imaging of the Antarctic and the Southern Polar Ocean. *International Journal of Remote Sensing* 22 (16):3253–3259.
- Datcu, M. 1997. A new image formation model for the segmentation of the snow cover in mountainous areas. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Davis, C.H. 1993. A surface and volume retracking algorithm for ice sheet satellite altimetry. *IEEE Transactions on Geoscience and Remote Sensing* 31:811–818.
- . 1995. Synthesis of passive microwave and radar altimeter data for estimating accumulation rates of dry polar snow. *International Journal of Remote Sensing* 16:2055–2067.
- Davis, D.T., Z.X. Chen, J.N. Hwang, A.T.C. Chang, and L. Tsang. 1993. Retrieval of snow parameters by iterative inversion of a neural-network. *IEEE Transactions on Geoscience and Remote Sensing* 31 (4):842–852.

- De Sève, D., M. Bernier, J-P. Fortin, and A. Walker. 1997. Preliminary analysis of the snow microwave radiometry using the SSM/I passive microwave data: the case of La Grande River watershed (Quebec). *Annals of Glaciology* 25:353–361.
- Demuth, M., and A. Pietroniro. 1999. Inferring glacier mass balance using RADARSAT: Results from Peyto Glacier, Canada. *Geografiska Annaler Series a — Physical Geography* 81A (4):521–540.
- Derksen, C., A. Walker, E. LeDrew, and B. Goodison. 2002. Time-series analysis of passive-microwave-derived central North American snow water equivalent imagery. *Annals of Glaciology* 34:1–7.
- Deser, C., J.E. Walsh, and M.S. Timlin. 2000. Arctic sea ice variability in the context of recent atmospheric circulation trends. *Journal of Climate* 13:617–633.
- Dickson, R.R., T.J. Osborn, J.W. Hurrell, J. Meincke, J. Blindheim, B. Adlandsvik, and others. 2000. The Arctic Ocean response to the North Atlantic Oscillation. *Journal of Climate* 13:2671–2696.
- Doake, C.S.M., H.F.J. Corr, H. Rott, P. Skvarca, and N.W. Young. 1998. Breakup and conditions for stability of the northern Larsen Ice Shelf, Antarctica. *Nature* 391 (6669):778–780.
- Dobrowolski, A., and R. Gronet. 1990. Use of airborne remote sensing for assessment of intensity of slush ice transport in river. Paper read at IAHR 10th Symposium on Ice, at Espoo.
- Dowdeswell, J.A. 1989. On the nature of the Svalbard icebergs. *Journal of Glaciology* 35:224–234.
- Dowdeswell, J.A., A.F. Glazovsky, and Y.Y. Macheret. 1995. Ice divides and drainage basins on the ice caps of Franz Josef Land, Russian High Arctic, defined from Landsat, KFA-1000, and ERS-1 SAR satellite imagery. *Arctic and Alpine Research* 27 (3):264–270.
- Dowdeswell, J.A., M.R. Gorman, A.F. Glazovsky, and Yu.Ya. Macheret. 1994. Evidence for floating ice shelves in Franz Josef Land, Russian High Arctic. *Arctic and Alpine Research* 26 (1):86–92.
- Dowdeswell, J.A., M.R. Gorman, Yu.Ya. Macheret, M.Yu. Moskalevsky, and J.O. Hagen. 1993. Digital comparison of high resolution Sojuzkarta KFA-1000 imagery of ice masses with Landsat and SPOT data. *Annals of Glaciology* 17:105–112.
- Dowdeswell, J.A., and N.F. McIntyre. 1986. The saturation of Landsat MSS detectors over large ice masses. *International Journal of Remote Sensing* 7 (1):151–164.
- Dowdeswell, J.A., W.G. Rees, and A.D. Diament. 1993. ERS-1 SAR investigations of snow and ice facies in the European High Arctic. Paper read at Space at the Service of Our Environment: Second ERS-1 Symposium, at Hamburg.
- Dowdeswell, J.A., and M. Williams. 1997. Surge-type glaciers in the Russian High Arctic identified from digital satellite imagery. *Journal of Glaciology* 43 (145):489–494.
- Dozier, J. 1984. Snow reflectance from Landsat-4 Thematic Mapper. *IEEE Transactions on Geoscience and Remote Sensing* GE22 (3):323–328.
- . 1989. Spectral signature of Alpine snow cover from the Landsat Thematic Mapper. *Remote Sensing of Environment* 28:9–22.
- Dozier, J., and J. Frew. 1990. Rapid calculation of terrain parameters for radiation modeling from digital elevation data. *IEEE Transactions on Geoscience and Remote Sensing* GE28 (5):963–969.

- Dozier, J., and D. Marks. 1987. Snow mapping and classification from Landsat Thematic Mapper data. *Annals of Glaciology* 9:97–103.
- Dozier, J., S.R. Schneider, and D.F. McGinnis. 1981. Effect of grain size and snowpack water equivalence on visible and near-infrared satellite observations of snow. *Water Resources Research* 17:1213–1221.
- Drewry, D.J. 1981. Radio echo sounding of ice masses: principles and applications. In *Remote Sensing in Meteorology, Oceanography and Hydrology*, edited by A.P. Cracknell. Chichester: Ellis Horwood.
- . 1983. Antarctic ice sheet thickness and volume. In *Antarctica: Glaciological and Geophysical Folio*, edited by D.J. Drewry. Cambridge: Cambridge University Press.
- Drinkwater, M.R. 1991. Ku-band airborne radar altimeter observations of sea ice during the 1984 Marginal Ice Zone Experiment. *Journal of Geophysical Research* 96 (C3):4555–4572.
- Drinkwater, M.R., R. Kwok, E. Rignot, H. Israelson, R.G. Onstott, and D.P. Winebrenner. 1992. Potential applications of polarimetry to the classification of sea ice. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Drinkwater, M.R., R. Kwok, D.P. Winebrenner, and E. Rignot. 1991. Multifrequency polarimetric synthetic aperture radar observations of sea ice. *Journal of Geophysical Research — Oceans* 96 (C11):20679–20698.
- Drinkwater, M.R., and V.A. Squire. 1989. C-band SAR observations of marginal ice zone rheology in the Labrador Sea. *IEEE Transactions on Geoscience and Remote Sensing* GE27:522–534.
- Duguay, C.R., and E.F. LeDrew. 1992. Estimating surface reflectance and albedo over rugged terrain from Landsat-5 Thematic Mapper. *Photogrammetric Engineering and Remote Sensing* 58 (5):551–558.
- Ebbesmeyer, C.C., A. Okubo, and H.J.M. Helset. 1980. Description of iceberg probability between Baffin Bay and the Grand Banks using a stochastic model. *Deep-Sea Research* 27A:975–986.
- Echelmeyer, K.A., W.D. Harrison, C.F. Larsen, J. Sapiano, J.E. Mitchell, J. DeMallie, and B. Rabus. 1996. Airborne surface elevation measurements of glaciers: a case study in Alaska. *Journal of Glaciology* 42 (142):538–547.
- Eisen, O., U. Nixdorf, F. Wilhelms, and H. Miller. 2002. Electromagnetic wave speed in polar ice: validation of the common-midpoint technique with high-resolution dielectric profiling and γ -density measurements. *Annals of Glaciology* 34:150–156.
- Ekhholm, S., R. Forsberg, and J.M. Brozena. 1995. Accuracy of satellite altimeter elevations over the Greenland ice sheet. *Journal of Geophysical Research* 100 (C2):2687–2696.
- El Naggar, S., C. Garrity, and R.O. Ramseier. 1998. The modelling of sea ice melt-water ponds for the High Arctic using an Airborne line scan camera, and applied to the Satellite Special Sensor Microwave/Imager (SSM/I). *International Journal of Remote Sensing* 19 (12):2373–2394.
- Elachi, C., M.L. Bryan, and W.F. Weeks. 1976. Imaging radar observations of frozen Arctic lakes. *Remote Sensing of Environment* 5:169–175.
- Emery, W.J., C.W. Fowler, J. Hawkins, and R.H. Preller. 1991. Fram Strait satellite image-derived ice motions. *Journal of Geophysical Research* 96 (C5):8917–8920.

- Engeset, R.V. 2000. Change detection and monitoring of glaciers and snow using satellite microwave imaging. PhD. University of Oslo, Oslo.
- Engeset, R.V., J. Kohler, K. Melvold, and B. Lundén. 2002. Change detection and monitoring of glacier mass balance and facies using ERS SAR winter images over Svalbard. *International Journal of Remote Sensing* 23 (10):2023–2050.
- Engeset, R.V., and R.S. Ødegård. 1999. Comparison of annual changes in winter ERS-1 SAR images and glacier mass balance of Slakbreen, Svalbard. *International Journal of Remote Sensing* 20 (2):259–271.
- Engeset, R.V., and D.J. Weydahl. 1998. Analysis of glaciers and geomorphology on Svalbard using multitemporal ERS-1 SAR images. *IEEE Transactions on Geoscience and Remote Sensing* 36 (6):1879–1887.
- Eppler, D.T., L.D. Farmer, A.W. Lohanick, M.R. Anderson, D.J. Cavalieri, J. Comiso, P. Gloersen, C. Garrity, T.C. Grenfell, M. Hallikainen, J.A. Maslanik, C. Mätzler, R.A. Melloh, I. Rubinstein, and C.T. Swift. 1992. Passive microwave signatures of sea ice. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Eyton, R. 1989. Low-relief topographic enhancement in a Landsat snow-cover scene. *Remote Sensing of Environment* 27:105–118.
- Fahnestock, M.A., W. Abdalati, and C.A. Shuman. 2002. Long melt seasons on ice shelves of the Antarctic Peninsula: an analysis using satellite-based microwave emission measurements. *Annals of Glaciology* 34:127–133.
- Fahnestock, M.A., and R.A. Bindschadler. 1993. Description of a program for SAR investigation of the Greenland ice sheet and an example of margin detection using SAR. *Annals of Glaciology* 17:332–336.
- Fahnestock, M.A., R.A. Bindschadler, R. Kwok, and K.C. Jezek. 1993. Greenland ice sheet surface properties and ice flow from ERS-1 SAR imagery. *Science* 262:1530–1534.
- Fahnestock, M.A., T.A. Scambos, C.A. Shuman, R.J. Arthern, D.P. Winebrenner, and R. Kwok. 2000. Snow megadune fields on the East Antarctic Plateau: extreme atmosphere–ice interaction. *Geophysical Research Letters* 27 (22):3719–3722.
- Fairbanks, R.G. 1989. A 17,000-year glacio-eustatic sea level record: influence of glacial melting rates on the Younger Dryas event and deep-ocean circulation. *Nature* 342 (6520):637–649.
- Fastook, J.L., H.H. Brecher, and T.J. Hughes. 1995. Derived bedrock elevations, strain rates and stresses from measured surface elevations and velocities: Jakobshavn Isbrae, Greenland. *Journal of Glaciology* 41 (137):161–173.
- Fatland, D.R., and C.S. Lingle. 1998. Analysis of the 1993–1995 Bering Glacier (Alaska) surge using differential SAR interferometry. *Journal of Glaciology* 44 (148):532–546.
- Favey, E., A. Geiger, G.H. Gudmundsson, and A. Wehr. 1999. Evaluating the potential of an airborne laser scanning system for measuring volume changes of glaciers. *Geografiska Annaler Series a — Physical Geography* 81:555–561.
- FENCO. 1987. Optimum deployment of TODs (TIROS Ocean Drifters) to derive ocean currents for iceberg drift forecasting. Ontario: Meteorological Services Branch, Atmospheric Environment Division.
- Ferrigno, J.G., and W.G. Gould. 1987. Substantial changes in the coastline of Antarctica revealed by satellite imagery. *Polar Record* 23 (146):577–583.
- Ferrigno, J.G., B.K. Lucchitta, K.F. Mullins, A.L. Allison, R.J. Allen, and W.G. Gould. 1993. Velocity measurements and changes in position of Thwaites

- Glacier/iceberg tongue from aerial photography, Landsat images and NOAA VHRR data. *Annals of Glaciology* 17:239–244.
- Ferrigno, J.G., R.S. Williams, E. Rosanova, B.K. Lucchitta, and C. Swithinbank. 1998. Analysis of coastal change in Marie Byrd Land and Ellsworth Land, West Antarctica, using Landsat imagery. *Annals of Glaciology* 27:33–40.
- Fetterer, F., and N. Untersteiner. 1998. Observations of melt ponds on Arctic sea ice. *Journal of Geophysical Research* 103 (C11):24821–24835.
- Fetterer, F.M., M.R. Drinkwater, K.C. Jezek, S.W.C. Laxon, R.G. Onstott, and L.M.H. Ulander. 1992. Sea ice altimetry. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Filin, S., and B. Csathó. 2002. Improvement of elevation accuracy for mass-balance monitoring using in-flight laser calibration. *Annals of Glaciology* 34:330–334.
- Fily, M., B. Bourdelles, J.P. Dedieu, and C. Sergent. 1997. Comparison of in situ and Landsat thematic mapper derived snow grain characteristics in the Alps. *Remote Sensing of Environment* 59 (3):452–460.
- Fily, M., J.P. Dedieu, and Y. Durand. 1999. Comparison between the results of a snow metamorphism model and remote sensing derived snow parameters in the Alps. *Remote Sensing of Environment* 68 (3):254–263.
- Fily, M., and D.A. Rothrock. 1991. Opening and closing of sea ice leads: digital measurements from synthetic aperture radar. *Journal of Geophysical Research* 95 (C1):789–796.
- Flint, R.F. 1971. *Glacial and Quaternary Geology*. 892 vols. New York: John Wiley.
- Forster, R.R., and B.L. Isacks. 1994. The Patagonian icefields revealed by space shuttle synthetic aperture radar (SIR-C/X-SAR) (abstract). *EOS Transactions* 75 (44):226.
- Forster, R.R., B.L. Isacks, and S.B. Das. 1996. Shuttle imaging radar (SIR-C/X-SAR) reveals near-surface properties of the South Patagonian ice field. *Journal of Geophysical Research* 101 (E10):23169–23180.
- Forster, R.R., K.C. Jezek, J. Bolzan, F. Baumgartner, and S.P. Gogineni. 1999. Relationships between radar backscatter and accumulation rates on the Greenland ice sheet. *International Journal of Remote Sensing* 20 (15):3131–3147.
- Forsythe, K.W. 1999. Developing snowpack models in the Kalkhochalpen region. PhD. University of Salzburg, Salzburg.
- Foster, J., D. Schultz, and W.C. Dallam. 1978. Ice conditions on the Chesapeake Bay as observed from Landsat during the winter of 1977. Paper read at 35th Eastern Snow Conference, at Hanover, New Hampshire.
- Foster, J.L., and A.T.C. Chang. 1993. Snow Cover. In *Atlas of Satellite Observations Related to Global Change*, edited by R.J. Gurney, J.L. Foster and C.L. Parkinson. Cambridge: Cambridge University Press.
- Frei, A., and D.A. Robinson. 1999. Northern hemisphere snow extent: regional variability 1972–1994. *International Journal of Climatology* 19 (14):1535–1560.
- Frezzotti, M., S. Gandolfi, F. La Marca, and S. Urbini. 2002. Snow dunes and glazed surfaces in Antarctica: new field and remote-sensing data. *Annals of Glaciology* 34:81–88.
- Fricker, H.A., N.W. Young, I. Allison, and R. Coleman. 2002. Iceberg calving from the Amery Ice Shelf, East Antarctica. *Annals of Glaciology* 34:241–246.
- Fujita, S., H. Maeno, T. Furukawa, and K. Matsuoka. 2002. Scattering of VHF radio waves from within the top 700 m of the Antarctic ice sheet and its relation to the

- depositional environment: a case-study along the Syowa-Mizuho-Dome Fuji traverse. *Annals of Glaciology* 34:157–164.
- Garrity, C. 1992. Characterization of snow on floating ice and case studies of brightness temperature changes during the onset of melt. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Garvin, J.B., and R.S. Williams. 1993. Geodetic airborne laser altimetry of Breidamerkurjökull and Skeidarárjökull, Iceland, and Jakobshavns Isbrae, West Greenland. *Annals of Glaciology* 17:379–385.
- Gatto, L.W. 1990. Monitoring river ice with Landsat images. *Remote Sensing of Environment* 32 (1):1–16.
- . 1993. River ice conditions determined from ERS-1 SAR. Paper read at Eastern Snow Conference 50th Annual Meeting, at Quebec, Canada.
- Gatto, L.W., and S.F. Daly. 1986. Ice conditions along the Allegheny, Monongahela and Ohio Rivers, 1983–1984. In *Internal Report*. Hanover, New Hampshire: U.S. Army Cold Regions Research and Engineering Laboratory.
- Giovinetto, M.B., and H.J. Zwally. 2000. Spatial distribution of net surface accumulation on the Antarctic ice sheet. *Annals of Glaciology* 31:171–178.
- Gloersen, P. 1995. Modulation of hemispheric ice cover by ENSO events. *Nature* 373:503–505.
- Gloersen, P., W.J. Campbell, D.J. Cavalieri, J.C. Comiso, C.L. Parkinson, and H.J. Zwally. 1992. *Arctic and Antarctic Sea Ice, 1978–1987: Satellite Passive-Microwave Observations and Analysis*. Vol. NASA SP-511. Washington DC: National Aeronautics and Space Administration.
- Gloersen, P., and D.J. Cavalieri. 1986. Reduction of weather effects in the calculation of sea ice concentrations from microwave radiances. *Journal of Geophysical Research* 91:3913–3919.
- Goodison, B.E. 1989. Determination of areal snow water equivalent on the Canadian Prairies using passive microwave satellite data. Paper read at International Geoscience and Remote Sensing Symposium (IGARSS), Quantitative Remote Sensing: an Economic Tool for the Nineties, 12th Canadian Symposium on Remote Sensing, at Vancouver.
- Goodison, B.E., and A.E. Walker. 1995. Canadian development and use of snow cover information from passive microwave satellite data. In *Passive Microwave Remote Sensing of Land-Atmosphere Interactions*, edited by B.J. Choudhury, Y.H. Kerr, E.G. Njoku, and P. Pampaloni. Zeist: VSP BV.
- Goodison, B.E., S.E. Waterman, and E.J. Langham. 1980. Application of synthetic aperture radar data to snow cover monitoring. Paper read at Sixth Canadian Symposium on Remote Sensing, at Halifax, Nova Scotia.
- Goodwin, I.D. 1990. Snow accumulation and surface topography in the katabatic zone of eastern Wilkes Land, Antarctica. *Antarctic Science* 2 (3):235–242.
- Grandell, J., J.A. Johannessen, and M.T. Hallikainen. 1999. Development of a synergetic sea ice retrieval method for the ERS-1 AMI wind scatterometer and SSM/I radiometer. *IEEE Transactions on Geoscience and Remote Sensing* 37 (2):668–679.
- Gratton, D.J., P.J. Howarth, and D.J. Marceau. 1990. Combining DEM parameters with Landsat MSS and TM imagery in a GIS for mountain glacier characterization. *IEEE Transactions on Geoscience and Remote Sensing* GE28 (4):766–769.

- Gray, A.L., and L.D. Arsenault. 1991. Time-delayed reflections in L-band synthetic aperture radar images of icebergs. *IEEE Transactions on Geoscience and Remote Sensing* GE29:284–291.
- Gray, A.L., C.E. Livingstone, and R.K. Hawkins. 1982. Testing radar systems in polar ice. *GEOS* 11:4–9.
- Gray, A.L., K.E. Mattar, and P.W. Vachon. 1998. InSAR results from the RADARSAT Antarctic mapping mission data: estimation of data using a simple registration procedure. Paper read at 18th International Geoscience and Remote Sensing Symposium, at Seattle.
- Gray, L., N. Short, R. Bindshadler, I. Joughin, L. Padman, P. Vornberger, and A. Khananian. 2002. RADARSAT interferometry for Antarctic grounding-zone mapping. *Annals of Glaciology* 34:269–276.
- Green, R.O., J. Dozier, D. Roberts, and T. Painter. 2002. Spectral snow-reflectance models for grain-size and liquid-water fraction in melting snow for the solar-reflected spectrum. *Annals of Glaciology* 34:71–73.
- Grenfell, T.C. 1983. A theoretical model of the optical properties of sea ice in the visible and near infrared. *Journal of Geophysical Research — Oceans and Atmospheres* 88 (C14):9723–9735.
- Grenfell, T.C., D.J. Cavalieri, J.C. Comiso, M.R. Drinkwater, R.G. Onstott, I. Rubinstein, K. Steffen, and D.P. Winebrenner. 1992. Considerations for microwave remote sensing of thin sea ice. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Grenfell, T.C., and G.A. Maykut. 1977. The optical properties of ice and snow in the Arctic Basin. *Journal of Glaciology* 18 (80):445–463.
- Grenfell, T.C., S.G. Warren, and P.C. Mullen. 1994. Reflection of solar radiation by the Antarctic snow at ultraviolet, visible and near-infrared wavelengths. *Journal of Geophysical Research* 99 (D9):18669–18684.
- Grody, N.C. 1991. Classification of snowcover and precipitation using the special sensor microwave imager. *Journal of Geophysical Research* 96:7423–7435.
- Grody, N.C., and A.N. Basist. 1996. Global identification of snowcover using SSM/I measurements. *IEEE Transactions on Geoscience and Remote Sensing* 34 (1):237–249.
- Gudmundsson, S., M.T. Gudmundsson, H. Björnsson, F. Sigmundsson, H. Rott, and J.M. Carstensen. 2002. Three-dimensional glacier surface motion maps at Gjalp eruption site, Iceland, inferred from combining InSAR and other displacement data. *Annals of Glaciology* 34:315–322.
- Guneriussen, T. 1997. Backscattering properties of a wet snow cover derived from DEM corrected ERS-1 SAR data. *International Journal of Remote Sensing* 18 (2):375–392.
- . 1998. Snow characteristics in mountainous areas as observed with synthetic aperture radar (SAR instruments). PhD. University of Tromsø, Tromsø.
- Guneriussen, T., K.A. Høgda, H. Johnson, and I. Lauknes. 2000. InSAR for estimation of changes in snow water equivalent of dry snow. Paper read at International Geosciences and Remote Sensing Symposium, at Honolulu.
- Guneriussen, T., H. Johnsen, and K. Sand. 1996. DEM corrected ERS-1 SAR data for snow monitoring. *International Journal of Remote Sensing* 18 (2):181–195.
- Gustajtis, K.A. 1979. Iceberg population distribution in the Labrador Sea: July data report. In *C-Core Publications*. St John's, Newfoundland: Centre for Cold Ocean Resources Engineering, Memorial University of Newfoundland.

- Haefliger, M., K. Steffen, and C. Fowler. 1993. AVHRR surface temperature and narrow-band albedo comparison with ground measurements for the Greenland Ice Sheet. *Annals of Glaciology* 17:49–54.
- Haefner, H., F. Holecz, E. Meier, D. Nüesch, and J. Piesbergen. 1993. Capabilities and limitations of ERS-1 SAR data for snow cover determination in mountainous regions. Paper read at Second ERS-1 Symposium: Space at the Service of Our Environment, at Hamburg, Germany.
- Haefner, H., and J. Piesbergen. 1997. Methods of snow cover monitoring with active microwave data in high mountain terrain. In *Proceedings of the EARSeL Workshop Remote Sensing of Land Ice and Snow*, edited by S. Wunderle. Saint-Étienne, France: European Association of Remote Sensing Laboratories.
- Hall, D.K. 1993. Active and passive microwave remote sensing of frozen lakes for regional climate studies. *Glaciological data*.
- Hall, D.K., R.A. Bindshadler, J.L. Foster, A.T.C. Chang, and H. Siddalingaiah. 1990. Comparison of *in situ* and satellite-derived reflectances of Forbindels Glacier, Greenland. *International Journal of Remote Sensing* 11 (3):493–504.
- Hall, D.K., A.T.C. Chang, J.L. Foster, C.S. Benson, and W.M. Kovalick. 1989. Comparison of *in situ* and Landsat derived reflectance of Alaskan glaciers. *Remote Sensing of Environment* 28:23–31.
- Hall, D.K., A.T.C. Chang, and H. Siddalingaiah. 1988. Reflectances of glaciers as calculated using Landsat-5 Thematic Mapper data. *Remote Sensing of Environment* 25 (3):311–321.
- Hall, D.K., D.B. Fagre, F. Klasner, G. Linebaugh, and G.E. Liston. 1994. Analysis of ERS 1 synthetic aperture radar data of frozen lakes in northern Montana and implications for climate studies. *Journal of Geophysical Research* 99 (C11):22473–22482.
- Hall, D.K., J.L. Foster, A.T.C. Chang, and A. Rango. 1981. Freshwater ice thickness observations using passive microwave sensors. *IEEE Transactions on Geoscience and Remote Sensing* GE19:189–193.
- Hall, D.K., J.L. Foster, J.R. Irons, and P.W. Dabney. 1993. Airborne bidirectional radiances of snow-covered surfaces in Montana, USA. *Annals of Glaciology* 17:35–40.
- Hall, D.K., J.L. Foster, V.V. Salomonson, A.G. Klein, and J.Y.L. Chien. 2001. Development of a technique to assess snow-cover mapping errors from space. *IEEE Transactions on Geoscience and Remote Sensing* GE39 (2):432–438.
- Hall, D.K., R.E.J. Kelly, G.A. Riggs, A.T.C. Chang, and J.L. Foster. 2002. Assessment of the relative accuracy of hemispheric-scale snow-cover maps. *Annals of Glaciology* 34:24–30.
- Hall, D.K., and J. Martinec. 1985. *Remote Sensing of Ice and Snow*. London: Chapman and Hall.
- Hall, D.K., J.P. Ormsby, R.A. Bindshadler, and H. Siddalingaiah. 1987. Characterization of snow and ice reflectance zones on glaciers using Landsat Thematic Mapper data. *Annals of Glaciology* 9:1–5.
- Hall, D.K., G.A. Riggs, and V.V. Salomonson. 1995. Development of methods for mapping global snow cover using moderate resolution imaging spectroradiometer data. *Remote Sensing of Environment* 54:127–140.
- Hall, D.K., and C. Roswell. 1981. The origin of water feeding icings on the eastern North Slope of Alaska. *Polar Record* 20:433–438.

- Hall, D.K., R.S. Williams, J.S. Barton, O. Sigurdsson, L.C. Smith, and J.B. Garvin. 2000. Evaluation of remote-sensing techniques to measure decadal-scale changes of Hofsjökull ice cap, Iceland. *Journal of Glaciology* 46:375–388.
- Hall, D.K., R.S. Williams, and K.J. Bayr. 1992. Glacier recession in Iceland and Austria. *Eos* 73 (12):129.
- Hallikainen, M. 1986. Retrieval of the water equivalent of snow cover in Finland by satellite microwave radiometry. *IEEE Transactions on Geoscience and Remote Sensing* GE-24:855–862.
- Hallikainen, M., V.I. Jääskeläinen, L. Kurvonen, J. Koskinen, E-A. Herland, and J. Perälä. 1992. Application of ERS-1 SAR data to snow mapping. Paper read at First ERS-1 Symposium: Space at the Service of Our Environment, at Cannes.
- Hallikainen, M., F.T. Ulaby, and M. Abdelrazik. 1986. Dielectric properties of snow in the 3 to 37 GHz range. *IEEE Transactions on Antennas and Propagation* AP34:1329–1340.
- Hallikainen, M., and D.P. Winebrenner. 1992. The physical basis for sea ice remote sensing. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington, DC: American Geophysical Union.
- Hallikainen, M.T. 1984. Retrieval of snow water equivalent from Nimbus-7 SMMR data: effect of land cover categories and weather conditions. *IEEE Journal of Oceanic Engineering* OE9 (5):372–376.
- Hallikainen, M.T., and P.A. Jolma. 1992. Comparison of algorithms for retrieval of snow water equivalent from Nimbus-7 SMMR data in Finland. *IEEE Transactions on Geoscience and Remote Sensing* GE30 (1):124–131.
- Hallikainen, M.T., F.T. Ulaby, and T.E. Van Deventer. 1987. Extinction behavior of dry snow in the 18–90 GHz range. *IEEE Transactions on Geoscience and Remote Sensing* 25:737–745.
- Hambrey, M.J., and J.A. Dowdeswell. 1994. Flow regime of the Lambert Glacier–Amery Ice Shelf system, Antarctica: Structural evidence from Landsat imagery. *Annals of Glaciology* 20:401–406.
- Hansen, B.U., and A. Mosbech. 1994. Use of NOAA-AVHRR data to monitor snow cover and spring melt-off in the wildlife habitats in Jameson Land, East Greenland. *Polar Research* 13 (1):125–137.
- Harrison, A.R., and R.M. Lucas. 1989. Multispectral classification of snow using NOAA AVHRR imagery. *International Journal of Remote Sensing* 10 (4–5):907–916.
- Haverkamp, D., L.K. Soh, and C. Tsatsoulis. 1995. A comprehensive, automated approach to determining sea ice thickness from SAR data. *IEEE Transactions on Geoscience and Remote Sensing* 33:46–57.
- Hawkins, J.D., D.A. May, F. Abell, and D. Ondrejuk. 1993. Antarctic tabular iceberg A-24 movement and decay via satellite remote sensing. Paper read at Fourth International Conference on Southern Hemisphere Meteorology and Oceanography, at Hobart.
- Heacock, T., T. Hirose, F. Lee, M. Manore, and B. Ramsay. 1993. Sea-ice tracking on the east coast of Canada using NOAA AVHRR imagery. *Annals of Glaciology* 17:405–413.
- Herzfeld, U.C., C.S. Lingle, and L-H. Lee. 1993. Geostatistical evaluation of satellite radar altimetry for high-resolution mapping of Lambert Glacier, Antarctica. *Annals of Glaciology* 17:77–85.

- Herzfeld, U.C., and M.S. Matassa. 1999. *GEOSAT Radar Altimeter DEM Atlas of Antarctica North of 72.1 Degrees South*. National Snow and Ice Data Center. (Cited 2004.) Available from <http://nsidc.org/data/nsidc-0075.html>.
- Hewison, T.J., and S.J. English. 1999. Airborne retrievals of snow and ice surface emissivity at millimeter wavelengths. *IEEE Transactions on Geoscience and Remote Sensing* 37 (4):1871–1879.
- Hiltbrunner, D., and C. Mätzler. 1997. Land surface temperature retrieval and snow discrimination using SSM/I data. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Hofer, R., and C. Mätzler. 1980. Investigations on snow parameters by radiometry in the 3- to 60-mm wavelength region. *Journal of Geophysical Research* 85 (C1):453–460.
- Hoinkes, H. 1967. Glaciology in the international hydrological decade. *IAHS Commission on Snow and Ice: Reports and Discussions* 79:7–16.
- Holben, B., and C.O. Justice. 1980. An examination of spectral band ratioing to reduce the topographic effect on remotely sensed data. In *Technical Memorandum: NASA*.
- Holden, C. 1977. Experts ponder icebergs as relief for world water dilemma. *Science* 198:274–276.
- Holladay, J.S., J.R. Rossiter, and A. Kovacs. 1990. Airborne measurement of sea ice thickness using electromagnetic induction sounding. Paper read at Ninth International Conference on Offshore Mechanical and Arctic Engineering, at Houston.
- Holt, B., D.A. Rothrock, and R. Kwok. 1992. Determination of sea ice motion from satellite images. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Hubbard, A., I. Willis, M. Sharp, D. Mair, P. Nienow, B. Hubbard, and H. Blatter. 2000. Glacier mass-balance determination by remote sensing and high-resolution modelling. *Journal of Glaciology* 46 (154):491–498.
- Hufford, G.L. 1981. Sea ice detection using enhanced infrared satellite data. *Mariners Weather Log* 25 (1):1–6.
- Ishizu, M., K. Mizutani, and T. Itabe. 1999. Airborne freeboard measurements of sea ice and lake ice at the Sea of Okhotsk coast in 1993–95 by a laser altimeter. *International Journal of Remote Sensing* 20 (12):2461–2476.
- Jacobel, R.W., and R. Bindschadler. 1993. Radar studies at the mouths of ice streams D and E, Antarctica. *Annals of Glaciology* 17:262–268.
- Jacobel, R.W., A.E. Robinson, and R.A. Bindschadler. 1994. Studies on the grounding-line location on ice streams D and E, Antarctica. *Annals of Glaciology* 20:39–42.
- Jacobs, J.D., É.L. Simms, and A. Simms. 1997. Recession of the southern part of Barnes Ice Cap, Baffin Island, Canada, between 1961 and 1993, determined from digital mapping of Landsat TM. *Journal of Glaciology* 43 (143):98–102.
- Jacobs, S.S., H.H. Hellmer, C.S.M. Doake, A. Jenkins, and R.M. Frohlich. 1992. Melting of ice shelves and the mass balance of Antarctica. *Journal of Glaciology* 38 (130):375–387.
- Jacobsen, A., A.R. Carstensen, and J. Kamper. 1993. Mapping of satellite derived surface albedo on the Mitdluagkat Glacier, Eastern Greenland, using a digital elevation model and SPOT HRV data. *Geografisk Tidsskrift* 93:6–18.
- Jeffries, M.O., K. Morris, W.F. Weeks, and H. Wakabayashi. 1994. Structural and stratigraphic features and ERS-1 SAR backscatter characteristics of ice growing

- on lakes in NW Alaska, winter 1991–92. *Journal of Geophysical Research* 99 (C11):22459–22471.
- Jeffries, M.O., and W.M. Sackinger. 1990. Ice island detection and characterization with airborne synthetic aperture radar. *Journal of Geophysical Research* 95 (C4):5371–5377.
- Jensen, H., and S. Løset. 1989. Ice management in the Barents Sea. Paper read at P.A. 89: Tenth Conference on Port and Ocean Engineering under Arctic Conditions, at Luleå.
- Jezek, K. 1992. Spatial patterns in backscatter strength across the Greenland ice sheet. Paper read at First ERS-1 Symposium: Space at the Service of Our Environment, at Cannes.
- Jezek, K.C. 1999. Glaciological properties of the Antarctic ice sheet from RADARSAT-1 synthetic aperture radar imagery. *Annals of Glaciology* 29:286–290.
- . 2002. RADARSAT-1 Antarctic Mapping Project: change-detection and surface velocity campaign. *Annals of Glaciology* 34:263–268.
- Jin, Z., and J.J. Simpson. 1999. Bidirectional anisotropic reflectance of snow and sea ice in AVHRR channel 1 and 2 spectral regions — Part 1: theoretical analysis. *IEEE Transactions on Geoscience and Remote Sensing* 37 (1):543–554.
- Jiskoot, H., P. Boyle, and T. Murray. 1998. The incidence of glacier surging in Svalbard: evidence from multivariate statistics. *Computers and Geosciences* 24 (4):387–399.
- Johannessen, O.M., J.A. Johannessen, J.H. Morison, B.A. Farrelly, and E.A.S. Svendsen. 1983. Oceanographic conditions in the marginal ice zone north of Svalbard in early fall 1979 with emphasis on mesoscale processes. *Journal of Geophysical Research* 88:2755–2769.
- Johannessen, O.M., S. Sandven, and K. Kloster. 1991. Remote sensing of icebergs in the Barents Sea during SI.E. 89. Paper read at POAC 91: Eleventh International Conference on Port and Ocean Engineering under Arctic Conditions, at St John's, Newfoundland.
- Johannessen, O.M., E.V. Shalina, and M.W. Miles. 1999. Satellite evidence for an Arctic sea ice cover in transformation. *Science* 286 (5446):1937–1939.
- Josberger, E.G., and N.M. Mognard. 1998. A passive microwave snow-depth algorithm with a proxy for snow metamorphism. Paper read at Fourth International Workshop on Applications of Remote Sensing in Hydrology, at Santa Fe.
- Josberger, E.G., N.M. Mognard, B. Lind, R. Matthews, and T. Carroll. 1998. Snowpack water-equivalent estimates from satellite and aircraft remote-sensing measurements of the Red River basin, north-central U.S.A. *Annals of Glaciology* 26:119–124.
- Joughin, I. 2002. Ice-sheet velocity mapping: a combined interferometric and speckle-tracking approach. *Annals of Glaciology* 34:195–201.
- Joughin, I., D. Winebrenner, M. Fahnestock, R. Kwok, and W. Krabill. 1996. Measurement of ice-sheet topography using satellite-radar interferometry. *Journal of Glaciology* 42:10–22.
- Joughin, I.R., R. Kwok, and M.A. Fahnestock. 1996. Estimation of ice sheet motion using satellite radar interferometry: Method and error analysis with application to Humboldt Glacier, Greenland. *Journal of Glaciology* 42 (142):564–575.
- . 1998. Interferometric estimation of three-dimensional ice-flow using ascending and descending passes. *IEEE Transactions on Geoscience and Remote Sensing* 36 (1):25–37.

- Kääb, A., F. Paul, M. Maisch, M. Hoelzle, and W. Haeberli. 2002. The new remote-sensing-derived Swiss glacier inventory: II: First results. *Annals of Glaciology* 34:362–366.
- Kapitsa, A.P., J.K. Ridley, G.deQ. Robin, M.J. Siegert, and I.A. Zotikov. 1996. A large deep freshwater lake beneath the ice of central East Antarctica. *Nature* 381:684–686.
- Kargel, J.S. 2000. New eyes in the sky measure glaciers and ice sheets. *Eos* 81 (24):265, 270–271.
- Kelly, R.E.J. 2002. Estimation of the ELA on Hardangerjøkulen, Norway, during the 1995/96 winter season using repeat-pass SAR coherence. *Annals of Glaciology* 34:349–354.
- Kendra, J.R., K. Sarabandi, and F.T. Ulaby. 1998. Radar measurements of snow: experiment and analysis. *IEEE Transactions on Geoscience and Remote Sensing* 36 (3):864–879.
- Kennett, M., and T. Eiken. 1997. Airborne measurements of glacier surface elevation by scanning laser altimeter. *Annals of Glaciology* 24:293–296.
- Ketchum, R.D. 1971. Airborne laser profiling of the Arctic packice. *Remote Sensing of Environment* 2:41–52.
- Key, J., and M. Haefliger. 1992. Arctic ice surface temperature retrieval from AVHRR thermal channels. *Journal of Geophysical Research* 97 (D5):5885–5893.
- Keys, H.J.R., S.S. Jacobs, and L.W. Brigham. 1998. Continued northward expansion of the Ross Ice Shelf, Antarctica. *Annals of Glaciology* 27:93–98.
- Keys, J.R., S.S. Jacobs, and D. Barnett. 1990. The calving and drift of iceberg B-9 in the Ross Sea, Antarctica. *Antarctic Science* 2:243–257.
- Khvorostovsky, K.S., L.P. Bobylev, and O.M. Johannessen. 2003. Greenland ice sheet elevation variations. In *Arctic Environment Variability in the Context of Global Change*, edited by L.P. Bobylev, K.Y. Kondratyev, and O.M. Johannessen. Chichester: Praxis-Springer.
- Kidder, S.Q., and H.T. Wu. 1984. Dramatic contrast between low cloud and snow cover in daytime 3.7 μm images. *Monthly Weather Review* 112 (11):2345–2346.
- Kirby, M.E. 1982. Digital image analysis of SAR imagery for the detection of icebergs. *Iceberg Research* 2:6–18.
- Kirby, M.E., and R.J. Lowry. 1979. Iceberg detectability problems using SAR and SLAR systems. Paper read at Fifth Annual W.T. Pecora Symposium: Satellite Hydrology, at Sioux Falls, South Dakota.
- Klein, A.G., and D.K. Hall. 1999. Snow albedo determination using the NASA MODIS instrument. Paper read at Eastern Snow Conference, 55th Annual Meeting, at Fredericton, New Brunswick.
- Klein, A.G., D.K. Hall, and G.A. Riggs. 1998. Improving snow-cover mapping in forests through the use of a canopy reflectance model. *Hydrological Processes* 12:1723–1744.
- Klein, A.G., and J. Stroeve. 2002. Development and validation of a snow albedo algorithm for the MODIS instrument. *Annals of Glaciology* 34:45–52.
- Kloster, K., and W. Spring. 1993. Iceberg and glacier mapping using satellite optical imagery during the Barents Sea ice surface data acquisition program (IDAP). Paper read at POAC 93: Twelfth International Conference on Port and Ocean Engineering under Arctic Conditions, at Hamburg.

- Knap, W.H., and J. Oerlemans. 1996. The surface albedo of the Greenland ice sheet: satellite-derived and in situ measurements in the Sondre Stromfjord area during the 1991 melt season. *Journal of Glaciology* 42 (141):364–374.
- Knap, W.H., and C.H. Reijmer. 1998. Anisotropy of the reflected radiation field over melting glacier ice: Measurements in Landsat TM bands 2 and 4. *Remote Sensing of Environment* 65:93–104.
- Knap, W.H., C.H. Reijmer, and J. Oerlemans. 1999. Narrowband to broadband conversion of Landsat TM glacier albedos. *International Journal of Remote Sensing* 20 (10):2091–2110.
- Koelemeijer, R., J. Oerlemans, and S. Tjemkes. 1993. Surface reflectance of Hinteresiferner, Austria, from Landsat 5 TM imagery. *Annals of Glaciology* 17:17–22.
- Koenig, L.S., K.R. Greenaway, M. Dunbar, and G. Hattersley-Smith. 1952. Arctic ice islands. *Arctic* 5:67–103.
- Koerner, R.M. 1970. Some observations on superimposition of ice on the Devon Island ice cap. *Geographical Annals* 52a (1):57–67.
- . 1989. Ice core evidence for extensive melting of the Greenland ice sheet in the last interglacial. *Science* 244 (4907):964–968.
- Komyshenets, V.I., and Ye.B. Leont'yev. 1989. The drift of a giant iceberg in the Weddell Sea. [Dreyf gigantskogo aysberga v more Uedella.] *Polar Geography and Geology* 13 (1):68–71.
- König, M., J. Wadham, J-G. Winther, J. Kohler, and A-M. Nuttall. 2002. Detection of superimposed ice on the glaciers Kongsvegen and midre Lovénbreen, Svalbard, using SAR imagery. *Annals of Glaciology* 34:335–342.
- König, M., J-G. Winther, and E. Isaksson. 2001. Measuring snow and glacier ice properties from satellite. *Reviews of Geophysics* 39 (1):1–27.
- Korsnes, R., S.R. Souza, R. Donangelo, A. Hansen, M. Paczuski, and K. Sneppen. 2004. Scaling in fracture and refreezing of sea ice. *Physica A* 331:291–296.
- Koskinen, J., L. Kurvonen, V. Jääskeläinen, and M. Hallikainen. 1994. Capability of radar and microwave radiometer to classify snow types in forested areas. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- Koskinen, J.T., J.T. Pulliainen, and M. Hallikainen. 1997. The use of ERS-1 SAR data in snow melt monitoring. *IEEE Transactions on Geoscience and Remote Sensing* 35 (3):601–610.
- Kotlyakov, V.M. 1970. Land glaciation part in the earth's water balance. Paper read at IAHS/Unesco Symposium on World Water Balance, at Reading.
- Kovacs, A., A.J. Gow, and R.M. Morey. 1995. The in-situ dielectric constant of polar firn revisited. *Cold Regions Science and Technology* 23 (3):245–256.
- Kovacs, A., and R.M. Morey. 1986. Electromagnetic measurements of multiyear sea ice using impulse radar. *Cold Regions Science and Technology* 12:67–93.
- Krabill, W., and 9 others. 2000. Greenland ice sheet: high-elevation balance and peripheral thinning. *Science* 289 (5478):428–430.
- Krabill, W.B., R.N. Swift, and W.B. Tucker. 1990. Recent measurements of sea ice topography in the Eastern Arctic. In *Sea Ice Properties and Processes*, edited by S.F. Ackley and W.F. Weeks. Hanover, New Hampshire: U.S. Army Cold Regions Research and Engineering Laboratory.

- Kramer, H.J. 1996. *Observation of the Earth and Its Environment*. 3rd ed. Berlin: Springer.
- Krimmel, R.M., and M.F. Meier. 1975. Glacier applications of ERTS images. *Journal of Glaciology* 15 (73):391–402.
- Kuga, Y., F.T. Ulaby, T.F. Haddock, and R.D. Deroo. 1991. Millimeter-wave radar scattering from snow.1. Radiative-transfer model. *Radio Science* 26 (2):329–341.
- Kuittinen, R. 1997. Optical and thermal sensors in snow cover modelling. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Kurvonen, L., and M. Hallikainen. 1997. Influence of land-cover category on brightness temperature of snow. *IEEE Transactions on Geoscience and Remote Sensing* 35 (2):367–377.
- Kwok, R. 2002. Arctic sea-ice area and volume production: 1996/97 versus 1997/98. *Annals of Glaciology* 34:447–453.
- Kwok, R., G. Cunningham, and B. Holt. 1992. An approach to the identification of sea ice types from spaceborne SAR data. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Kwok, R., and G.F. Cunningham. 1994. Backscatter characteristics of the winter ice cover in the Beaufort Sea. *Journal of Geophysical Research* 99:7787–7802.
- Kwok, R., J.C. Curlander, R. McConnell, and S.S. Pang. 1990. An ice-motion tracking system at the Alaska SAR Facility. *IEEE Journal of Oceanic Engineering* OE15 (1):44–54.
- Kwok, R., and M.A. Fahnestock. 1996. Ice sheet motion and topography from radar interferometry. *IEEE Transactions on Geoscience and Remote Sensing* 34:189–200.
- Kwok, R., E. Rignot, B. Holt, and R.G. Onstott. 1992. Identification of sea ice type in spaceborne SAR data. *Journal of Geophysical Research* 97:2391–2402.
- Laberge, M.J., and S. Payette. 1995. Long-term monitoring of permafrost change in palsa peatland in northern Quebec, Canada: 1983–1993. *Arctic and Alpine Research* 27:167–171.
- Lachenbruch, A.H., and B.V. Marshall. 1986. Changing climate: geothermal evidence from permafrost in the Alaskan Arctic. *Science* 234:689–696.
- Larrowe, B.T., R.B. Innes, R.A. Rendleman, and R.J. Porcello. 1971. Lake ice surveillance via airborne radar: some experimental results. Ann Arbor, Michigan: University of Michigan.
- Larson, R.W., R.A. Schuchman, R.A. Rawson, and R.D. Worsfold. 1978. The use of SAR systems for iceberg detection and characterization. Paper read at Twelfth International Symposium on Remote Sensing of Environment, at Ann Arbor.
- Laxon, S.W.C. 1989. Satellite radar altimetry over sea ice. PhD. Mullard Space Science Laboratory, University College London, London.
- Lazzara, M.A., K.C. Jezek, T.A. Scambos, D.R. MacAyeal, and C.J. Van der Veen. 1999. On the recent calving of icebergs from the Ross Ice Shelf. *Polar Geography* 23 (3):201–212.
- Leconte, R., and P.D. Klassen. 1991. Lake and river ice investigations in northern Manitoba using airborne SAR imagery. *Arctic* 44 (supp 1):153–163.
- Lefauconnier, B., J.O. Hagen, and J.P. Rudant. 1994. Flow speed and calving rate of Kongsbreen glacier, Svalbard, using SPOT images. *Polar Research* 13 (1):59–65.
- Leshkevich, G.A. 1981. Categorization of Northern Green Bay ice cover using Landsat-1 digital data — a case study. In *NOAA Technical Memorandum: National Oceanographic and Atmospheric Administration*.

- . 1985. Machine classification of freshwater ice types from Landsat-1 digital data using ice albedos as training sets. *Remote Sensing of Environment* 17:251–263.
- Lewis, E.O., C.E. Livingstone, C. Garrity, and J.R. Rossiter. 1994. Properties of ice and snow. In *Remote Sensing of Sea Ice and Icebergs*, edited by S. Haykin, E.O. Lewis, R.K. Raney, and J.R. Rossiter. New York: John Wiley & Sons.
- Li, Z.Q., and H.G. Leighton. 1992. Narrow-band to broad-band conversion with autocorrelated reflectance measurements. *Journal of Applied Meteorology* 31 (5):421–432.
- Liu, A.K., and D.J. Cavalieri. 1998. On sea ice drift from the wavelet analysis of the Defense Meteorological Satellite Program (DMSP Special Sensor Microwave Imager (SSM/I) data. *International Journal of Remote Sensing* 19 (7):1415–1423.
- Liu, H., K.C. Jezek, and B. Li. 1999. Development of an Antarctic digital elevation model by integrating cartographic and remotely sensed data: a geographic information system based approach. *Journal of Geophysical Research* 104 (B10):23199–23213.
- Livingstone, C.E., R.K. Hawkins, A.L. Gray, L.D. Arsenault, K. Okamoto, T.L. Wilkinson, and D. Pearson. 1983. The CCRS/SURSAT active–passive experiment 1978–1980. The microwave signatures of sea ice. Ottawa: Canada Centre for Remote Sensing.
- Livingstone, C.E., R.G. Onstott, L.D. Arsenault, A.L. Gray, and K.P. Singh. 1987. Microwave sea-ice signatures near the onset of melt. *IEEE Transactions on Geoscience and Remote Sensing* 25:174–187.
- Løset, S., and T. Carstens. 1993. Production of icebergs and observed extreme drift speeds in the Barents Sea. Paper read at POAC 93: Twelfth International Conference on Port and Ocean Engineering under Arctic Conditions, at Hamburg.
- Løvås, S.M., W. Spring, and A. Holm. 1993. Stereo photogrammetric analysis of icebergs and sea ice from the Barents Sea ice data acquisition program (IDAP). Paper read at POAC 93: Twelfth International Conference on Port and Ocean Engineering under Arctic Conditions, at Hamburg.
- Lowry, R.T., and J. Miller. 1983. Iceberg mapping in Lancaster Sound with synthetic aperture radar. *Iceberg Research* 6:3–9.
- Lucchitta, B.K., K.F. Mullins, A.L. Allison, and J.G. Ferrigno. 1993. Antarctic glacier-tongue velocities from Landsat images: first results. *Annals of Glaciology* 17:356–366.
- Lucchitta, B.K., C.F. Rosanova, and K.F. Mullins. 1995. Velocities of Pine Island Glacier, West Antarctica, from ERS-1 SAR images. *Annals of Glaciology* 21:277–283.
- Lundstrom, S.C., A.E. McCafferty, and J.A. Coe. 1993. Photogrammetric analysis of 1984–89 surface altitude change of the partially debris-covered Eliot Glacier, Mount Hood, Oregon, USA. *Annals of Glaciology* 17:167–170.
- Lure, Y.M.F., N.C. Grody, H.Y.M. Yeh, and J.S.J. Lin. 1992. Neural network approaches to classification of snow cover and precipitation from special sensor microwave imager (SSM/I). Paper read at Eighth International Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography and Hydrology, at Atlanta, Georgia.
- Lythe, M., A. Hauser, and G. Wendler. 1999. Classification of sea ice types in the Ross Sea, Antarctica from SAR and AVHRR imagery. *International Journal of Remote Sensing* 20 (15):3073–3085.

- Mackay, D.K., and O.H. Løken. 1974. Arctic hydrology. In *Arctic and Alpine Environments*, edited by J.D. Ives and R.G. Barry. London: Methuen.
- Macqueen, A.D. 1988. Radio echo-sounding as a glaciological technique: a bibliography. Cambridge: World Data Centre "C" for glaciology.
- Markus, T., D.J. Cavalieri, and A. Ivanoff. 2002. The potential of using Landsat 7 ETM+ for the classification of sea-ice surface conditions during summer. *Annals of Glaciology* 34:415–419.
- Marshall, G.J., W.G. Rees, and J.A. Dowdeswell. 1993. Limitations imposed by cloud cover on multitemporal visible and satellite data sets from polar regions. *Annals of Glaciology* 17:113–120.
- Marshall, G.J., W.G. Rees, and J.A. Dowdeswell. 1995. The discrimination of glacier facies in ERS-1 SAR data. In *Sensors and Environmental Applications of Remote Sensing Data*, edited by J. Askne. Rotterdam: A.A. Balkema.
- Martin, S., K. Steffen, J. Comiso, D. Cavalieri, M.R. Drinkwater, and B. Holt. 1992. Microwave remote sensing of polynyas. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Martin, T.V., H.J. Zwally, A.C. Brenner, and R.A. Bindshadler. 1983. Analysis and retracking of continental ice sheet radar altimeter waveforms. *Journal of Geophysical Research* 88:1608–1616.
- Martinec, J. 1977. Expected snow loads on structures from incomplete hydrological data. *Journal of Glaciology* 19 (81):185–195.
- Martinec, J., A. Rango, and E. Major. 1983. The Snowmelt Runoff-Model (SRM) user's manual. In *NASA Reference Publication: National Aeronautics and Space Administration*.
- Maslanik, J.A., and R.G. Barry. 1987. Lake ice formation and breakup as an indicator of climatic change potential for monitoring remote sensing techniques. Paper read at The Influence of Climatic Change and Climatic Variability on the Hydrologic Regime and Water Resources, at Vancouver.
- Massom, R.A. 1991. *Satellite Remote Sensing of Polar Regions*. Boca Raton, Florida: Lewis Publications.
- Matson, M., C.F. Ropelewski, and M.S. Varnardore. 1986. *An Atlas of Satellite-Derived Northern Hemisphere Snow Cover Frequency*. Washington, DC: U.S. Department of Commerce. National Oceanic and Atmospheric Administration Data and Information Service. National Environmental Satellite, Data and Information Service.
- Matsuoka, K., H. Maeno, S. Uratsuka, S. Fujita, T. Furukawa, and O. Watanabe. 2002. A ground-based, multi-frequency ice-penetrating radar system. *Annals of Glaciology* 34:171–176.
- Matsuoka, T., S. Uratsuka, M. Satake, A. Nadai, T. Umehara, H. Maeno, H. Wakabayashi, F. Nishio, and Y. Fukamachi. 2002. Deriving sea-ice thickness and ice types in the Sea of Okhotsk using dual-frequency airborne SAR (Pi-SAR) data. *Annals of Glaciology* 34:429–434.
- Mätzler, C. 1987. Applications of the interaction of microwaves with the natural snow cover. *Remote Sensing Reviews* 2:259–387.
- . 1994. Passive microwave signatures of landscapes in winter. *Meteorology and Atmospheric Physics* 54 (1–4):241–260.
- Mätzler, C., and U. Wegmüller. 1987. Dielectric properties of freshwater ice at microwave frequencies. *Journal of Physics D: Applied Physics* 20:1623–1630.

- Maxfield, A.W. 1994. Radar satellite snowmelt detection in the Canadian Rocky Mountains. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- Maykut, G.A. 1986. The surface heat and mass balance. In *Geophysics of Sea Ice*, edited by N. Untersteiner. London: Plenum Press.
- Maykut, G.A. 1985. The ice environment. In *Sea Ice Biota*, edited by R.A. Horner. Boca Raton, Florida: CRC Press.
- Meier, M.F. 1984. Contribution of small glaciers to global sea level. *Science* 226 (4681):1418–1421.
- . 1990. Reduced rise in sea level. *Nature* 343:115.
- Melling, H. 1998. Detection of features in first-year pack ice by synthetic aperture radar (SAR). *International Journal of Remote Sensing* 19 (6):1223–1249.
- Melloh, R.A., and L.W. Gatto. 1990. Interpretation of passive and active microwave imagery over snow-covered lakes and rivers near Fairbanks, Alaska. Paper read at Workshop on Applications of Remote Sensing in Hydrology, at Saskatoon, Saskatchewan.
- Merson, R.H. 1989. An AVHRR mosaic image of Antarctica. *International Journal of Remote Sensing* 10:669–674.
- Michel, B. 1971. Winter regime of rivers and lakes. In *Cold Regions Science and Engineering Monographs*. Hanover, New Hampshire: U.S. Army Cold Regions Research and Engineering Laboratory.
- Michel, R., and E. Rignot. 1999. Flow of Glacier Moreno, Argentina, from repeat-pass Shuttle Imaging Radar images: comparison of the phase correlation method with radar interferometry. *Journal of Glaciology* 45 (149):93–100.
- Middleton, W.E., and A.G. Mungall. 1952. The luminous directional reflectance of snow. *Journal of the Optical Society of America* 42:572–579.
- Mognard, N. 2003. Snow cover dynamics. In *Arctic Environment Variability in the Context of Global Change*, edited by L.P. Bobylev, K.Y. Kondratyev, and O.M. Johannessen. Chichester: Praxis-Springer.
- Mognard, N.M., and E.G. Josberger. 2002. Northern Great Plains 1996/97 seasonal evolution of snowpack parameters from satellite passive-microwave measurements. *Annals of Glaciology* 34:15–23.
- Morris, K., M.O. Jeffries, and W.S. Weeks. 1995. Ice processes and growth history on Arctic and sub-Arctic lakes using ERS-1 SAR data. *Polar Record* 31 (117):115–128.
- Mote, T.L., and M.R. Anderson. 1995. Variations in snowpack melt on the Greenland ice sheet based on passive-microwave measurements. *Journal of Glaciology* 41 (137):51–60.
- Mote, T.L., M.R. Anderson, K.C. Kuivinen, and C.M. Rowe. 1993. Passive microwave-derived spatial and temporal variations of summer melt on the Greenland ice sheet. *Annals of Glaciology* 17:233–238.
- Müller, F. 1962. Zonation in the accumulation area of the glaciers of Axel Heiberg Island, NWT. Canada. *Journal of Glaciology* 4:302–313.
- Müller, F., T. Caflisch, and G. Müller. 1976. *Firn und Eis der Schweizer Alpen: Gletscherinventar*, Geographisches Institut Publ. Zürich: Eidgenössische Technische Hochschule.
- Murphy, D.L., and G.L. Wright. 1991. Iceberg movement determined by satellite tracked platforms: International Ice Patrol in the North Atlantic.

- Murray, T., T. Strozzi, A. Luckman, H. Pritchard, and H. Jiskoot. 2002. Ice dynamics during a surge of Sortebrae, East Greenland. *Annals of Glaciology* 34:323–329.
- Nagler, T. 1991. Verfahren zur Analyse der Schneebedeckung aus Messungen des SSM/I. Diplomarbeit, Universität Innsbruck, Innsbruck.
- Nagler, T., and H. Rott. 1997. The application of ERS-1 SAR for snowmelt runoff modelling. Paper read at Remote Sensing and Geographic Information Systems for Design and Operation of Water Resources Systems, at Rabat, Morocco.
- Nagurny, A.P., V.G. Korostelev, and V.V. Ivanov. 1999. Multiyear variability of sea ice thickness in the Arctic Basin measured by elastic-gravity waves on the ice surface. *Meteorologiya i Hidrologiya* 3:72–78.
- Narayanan, R.M., and S.R. Jackson. 1994. Snow cover classification using millimeter-wave radar imagery. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- Negri, A.J., E.J. Nelkin, R.F. Adler, G.J. Huffman, and C. Kummerow. 1995. Evaluation of passive microwave precipitation algorithms in wintertime midlatitude situations. *Journal of Atmospheric and Oceanic Technology* 12:20–32.
- Ninnis, R.M., W.J. Emery, and M.J. Collins. 1986. Automated extraction of pack ice motion from advanced very high resolution radiometer imagery. *Journal of Geophysical Research* 91 (C9):10725–10734.
- Nolin, A.W., and J. Dozier. 1993. Estimating snow grain-size using AVIRIS data. *Remote Sensing of Environment* 44 (2–3):231–238.
- . 2000. A hyperspectral method for remotely sensing the grain size of snow. *Remote Sensing of Environment* 74 (2):207–216.
- Nolin, A.W., J. Dozier, and L.A.K. Mertes. 1993. Mapping alpine snow cover using a spectral mixture modeling technique. *Annals of Glaciology* 17:121–124.
- Nolin, A.W., and J. Stroeve. 1997. The changing albedo of the Greenland ice sheet: implications for climate modeling. *Annals of Glaciology* 25:51–57.
- Nyfors, E. 1982. On the dielectric properties of dry snow in the 800 MHz to 13 GHz range. Helsinki: Radio Laboratory, Helsinki University of Technology.
- Nystuen, J.A., and F.W. Garcia. 1992. Sea ice classification using SAR backscatter statistics. *IEEE Transactions on Geoscience and Remote Sensing* GE30:502–509.
- Onstott, R.G. 1992. SAR and scatterometer signatures of sea ice. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Oppenheimer, M. 1998. Global warming and the stability of the West Antarctic ice sheet. *Nature* 393 (6683):325–332.
- Orheim, O. 1988. Antarctic icebergs — production, distribution and disintegration. *Annals of Glaciology* 11:205.
- Orheim, O., and B.K. Lucchitta. 1988. Numerical analysis of Landsat thematic mapper images of Antarctica: Surface temperatures and physical properties. *Annals of Glaciology* 11:109–120.
- Padman, L., H.A. Fricker, R. Coleman, S. Howard, and L. Erofeeva. 2002. A new tide model for the Antarctic ice shelves and seas. *Annals of Glaciology* 34:247–254.
- Palecki, M.A., and R.G. Barry. 1986. Freeze-up and break-up of lakes as an index of temperature changes during the transition seasons: a case study in Finland. *Journal of Climate and Applied Meteorology* 25:893–902.

- Papa, F., B. Legresy, N.M. Mognard, E.G. Josberger, and F. Rémy. 2002. Estimating terrestrial snow depth with Topex-Poseidon altimeter and radiometer. *IEEE Transactions on Geoscience and Remote Sensing* 40 (10):2162–2169.
- Parashar, S.K., C. Roche, and R.D. Worsfold. 1978. Four channel synthetic aperture radar imagery results of freshwater ice and sea ice in Lake Melville. St John's, Newfoundland: C-Core.
- Paren, J., and G. deQ. Robin. 1975. Internal reflections in polar ice sheets. *Journal of Glaciology* 14 (71):251–259.
- Parkinson, C.L. 1994. Spatial patterns in the length of the sea ice season in the Southern Ocean, 1979–1986. *Journal of Geophysical Research* 99 (C8):16327–16339.
- . 2002. Trends in the length of the Southern Ocean sea-ice season, 1979–99. *Annals of Glaciology* 34:435–440.
- Parkinson, C.L., and D.J. Cavalieri. 2002. A 21 year record of Arctic sea-ice extents and their regional, seasonal and monthly variability trends. *Annals of Glaciology* 34:441–446.
- Parkinson, C.L., D.J. Cavalieri, P. Gloersen, H.J. Zwally, and J. Comiso. 1999. Arctic sea ice extents, areas and trends, 1978–1996. *Journal of Geophysical Research* 104 (C9):20837–20856.
- Parkinson, C.L., and P. Gloersen. 1993. Global sea ice coverage. In *Atlas of Satellite Observations Related to Global Change*, edited by R.J. Gurney, J.L. Foster, and C.L. Parkinson. Cambridge: Cambridge University Press.
- Parrot, J.F., N. Lyberis, B. Lefauconnier, and G. Manby. 1993. SPOT multispectral data and digital terrain model for the analysis of ice-snow fields on Antarctic glaciers. *International Journal of Remote Sensing* 14 (3):425–440.
- Partington, K.C. 1998. Discrimination of glacier facies using multi-temporal SAR data. *Journal of Glaciology* 44 (146):42–53.
- Paterson, W.S.B. 1994. *The Physics of Glaciers*, 3rd ed. Kidlington: Elsevier Science.
- Pattyn, F., and H. Declerq. 1993. Satellite monitoring of ice and snow conditions in the Sør Rondane Mountains, Antarctica. *Annals of Glaciology* 17:41–48.
- Paul, F., A. Kääb, M. Maisch, T. Kellenberger, and W. Haeberli. 2002. The new remote-sensing-derived Swiss glacier inventory: I: Methods. *Annals of Glaciology* 34:355–361.
- Peel, D.A. 1992. Spatial temperature and accumulation rate variations in the Antarctic Peninsula. In *The Contribution of Antarctic Peninsula Ice to Sea Level Rise (CEC Project Report EPOC-CT90-0015)*, edited by E.M. Morris. Cambridge: British Antarctic Survey.
- Perovich, D.K. 1989. A two-stream multilayer, spectral radiative transfer model for sea ice. Hanover, New Hampshire: Cold Regions Research and Engineering Laboratory.
- Perovich, D.K., and T.C. Grenfell. 1981. Laboratory studies of the optical properties of young sea ice. *Journal of Glaciology* 96:331–346.
- Perovich, D.K., G.A. Maykut, and T.C. Grenfell. 1986. Optical properties of ice and snow in the polar oceans. I: Observations. *SPIE Journal* 637:232–244.
- Pivot, F.C., C. Kergomard, and C.R. Duguay. 2002. Use of passive-microwave data to monitor spatial and temporal variations of snow cover at tree line near Churchill, Manitoba, Canada. *Annals of Glaciology* 34:58–64.
- Proy, C., D. Tanré, and P.Y. Deschamps. 1989. Evaluation of topographic effects in remotely sensed data. *Remote Sensing of Environment* 30:21–32.

- Pulliainen, J.T., and M. Hallikainen. 2001. Retrieval of Regional Snow Water Equivalent from Space-Borne Passive Microwave Observations. *Remote Sensing of Environment* 75 (1):76–85.
- Qunzhu, Z., C. Meisheng, and F. Xuezhong. 1984. Study on Spectral reflection characteristics of snow, ice and water of northwestern China. *Sci. Sinica (Series B)* 27:647–656.
- Ramage, J.M., and B.L. Isacks. 2002. Determination of melt-onset and refreeze timing on southeast Alaskan icefields using SSM/I diurnal amplitude variations. *Annals of Glaciology* 34:391–398.
- Ramage, J.M., B.L. Isacks, and M.M. Miller. 2000. Radar glacier zones in southeast Alaska, USA: field and satellite observations. *Journal of Glaciology* 46 (153):287–296.
- Ramsay, B.H. 1998. The interactive multisensor snow and ice mapping system. *Hydrological Processes* 12 (10–11):1537–1546.
- Rango, A. 1993. Snow hydrology processes and remote-sensing. 2. *Hydrological Processes* 7 (2):121–138.
- Rango, A., A.T.C. Chang, and J.L. Foster. 1979. The utilization of spaceborne microwave radiometers for monitoring snowpack properties. *Nordic Hydrology* 10 (1):25–40.
- Rango, A., and A.I. Shalaby. 1998. Operational applications of remote sensing in hydrology: success, prospects and problems. *Hydrological Sciences Journal (Journal Des Sciences Hydrologiques)* 43 (6):947–968.
- Rau, F., and M. Braun. 2002. The regional distribution of the dry-snow zone on the Antarctic Peninsula north of 70° S. *Annals of Glaciology* 34:95–100.
- Rees, W.G. 1988. Synthetic aperture radar data over terrestrial ice. Paper read at International Geoscience and Remote Sensing Symposium. Remote Sensing: Moving Towards the 21st Century, at Edinburgh.
- . 1999. *The Remote Sensing Data Book*. Cambridge: Cambridge University Press.
- . 2001. *Physical Principles of Remote Sensing*, 2nd ed. Cambridge: Cambridge University Press.
- Rees, W.G., and R.E. Donovan. 1992. Refraction correction for radio echo sounding of large ice masses. *Journal of Glaciology* 38 (129):302–308.
- Rees, W.G., and J.A. Dowdeswell. 1988. Topographic effects on light scattering from snow. Paper read at IGARSS 88, at Edinburgh.
- Rees, W.G., J.A. Dowdeswell, and A.D. Diament. 1995. Analysis of ERS-1 Synthetic Aperture Radar data from Nordaustlandet, Svalbard. *International Journal of Remote Sensing* 16 (5):905–924.
- Rees, W.G., and I. Lin. 1993. Texture-based classification of cloud and ice-cap surface features. *Annals of Glaciology* 17:250–254.
- Rees, W.G., and A.M. Steel. 2001. Radar backscatter coefficients and snow detectability for upland terrain in Scotland. *International Journal of Remote Sensing* 22 (15):3015–3026.
- Richards, J.A. 1993. *Remote Sensing Digital Image Analysis*. 2nd ed. Berlin: Springer-Verlag.
- Ridley, J.K. 1993a. Climate signals from SSM/I observations of marginal ice shelves. *Annals of Glaciology* 17:189–194.
- . 1993b. Surface melting on Antarctic Peninsula ice shelves detected by passive microwave sensors. *Geophysical Research Letters* 20 (23):2639–2642.

- Ridley, J.K., and K.C. Partington. 1988. A model of satellite radar altimeter return from ice sheets. *International Journal of Remote Sensing* 9:601–624.
- Riggs, G.A., D.K. Hall, and S.A. Ackerman. 1999. Sea ice extent and classification mapping with the moderate resolution imaging spectroradiometer airborne simulator. *Remote Sensing of Environment* 68 (2):152–163.
- Rignot, E. 2002. Mass balance of East Antarctic glaciers and ice shelves from satellite data. *Annals of Glaciology* 34:217–227.
- Rignot, E., G. Buscarlet, B. Csatho, S. Gogineni, W. Krabill, and M. Schmeltz. 2000. Mass balance of the northeast sector of the Greenland ice sheet: a remote-sensing perspective. *Journal of Glaciology* 46 (153):265–273.
- Rivera, A., C. Acuña, G. Casassa, and F. Bown. 2002. Use of remotely sensed and field data to estimate the contribution of Chilean glaciers to eustatic sea-level rise. *Annals of Glaciology* 34:367–372.
- Robin, G. deQ., S. Evans, and J.T. Bailey. 1969. Interpretation of radio echo sounding in polar ice sheets. *Philosophical Transactions of the Royal Society of London Series A — Mathematical Physical and Engineering Sciences* 265 (1166):437–505.
- Robinson, D.A. 1993. Hemispheric snow cover from satellites. *Annals of Glaciology* 17:367–371.
- . 1997. Hemispheric snow cover and surface albedo for model validation. *Annals of Glaciology* 25:241–245.
- . 1999. Northern hemisphere snow cover during the satellite era. Paper read at Fifth Conference on Polar Meteorology and Oceanography, at Dallas, Texas.
- Robinson, D.A., K.F. Dewey, and R.R. Heim. 1993. Global snow cover monitoring: an update. *Bulletin of the American Meteorological Society* 74 (9):1689–1696.
- Romanov, P., G. Gutman, and I. Csiszar. 2000. Automated monitoring of snow cover over North America using multispectral satellite data. *Journal of Applied Meteorology* 39:1866–1890.
- Rosenfeld, S., and N. Grody. 2000. Metamorphic signature of snow revealed in SSM/I measurements. *IEEE Transactions on Geoscience and Remote Sensing* 38 (1):53–63.
- Rosenthal, W., and J. Dozier. 1996. Automated mapping of montane snow cover at sub-pixel resolution from Landsat Thematic Mapper. *Water Resources Research* 6 (12):2370–2393.
- Ross, B., and J. Walsh. 1986. Synoptic-scale influences of snow cover and sea ice. *Monthly Weather Review* 114 (10):1795–1810.
- Rossiter, J.R., L.D. Arsenault, J. Benoit, A.L. Gray, E.V. Guy, D.J. Lapp, R.O. Ramseier, and E. Wedler. 1984. Detection of icebergs by airborne imaging radars. Paper read at Ninth Canadian Symposium on Remote Sensing, at St John's, Newfoundland.
- Rossiter, J.R., and K.A. Gustajtis. 1978. Iceberg sounding of impulse radar. *Nature* 271:48–50.
- Rossiter, J.R., and J.S. Holladay. 1994. Ice-thickness measurement. In *Remote Sensing of Sea Ice and Icebergs*, edited by S. Haykin, E.O. Lewis, R.K. Raney and J.R. Rossiter. New York: John Wiley & Sons.
- Rossiter, J.R., and others. 1995. Remote sensing ice detection capabilities. Environmental Studies Research Funds.
- Rothrock, D.A., Y. Yu, and G.A. Maykut. 1999. Thinning of Arctic sea ice cover. *Geophysical Research Letters* 26 (23):3469–3472.

- Rott, H. 1984. The analysis of backscattering properties from SAR data of mountain regions. *IEEE Journal of Oceanic Engineering* 9 (5):347–353.
- . 1994. Thematic studies in Alpine areas by means of polarimetric SAR and optical imagery. *Advances in Space Research* 14 (3):217–226.
- Rott, H., and R.E. Davies. 1993. Multifrequency and polarimetric SAR observations on alpine glaciers. *Annals of Glaciology* 17:98–104.
- Rott, H., R.E. Davis, and J. Dozier. 1992. Polarimetric and multifrequency SAR signatures of wet snow. Paper read at IGARSS '92, at Houston, Texas.
- Rott, H., G. Domik, C. Mätzler, H. Miller, and K.G. Lenhart. 1985. Study on use and characteristics of SAR for land snow and ice applications. Innsbruck: Institut für Meteorologie und Geophysik, Universität Innsbruck.
- Rott, H., D-M. Floricioiu, and A. Siegel. 1997. Polarimetric and interferometric analysis of SIR-C/X-SAR data for glacier research. In *Proceedings of the EARSeL Workshop Remote Sensing of Land Ice and Snow*, edited by S. Wunderle. Saint-Étienne, France: European Association of Remote Sensing Laboratories.
- Rott, H., and C. Mätzler. 1987. Possibilities and limitations of synthetic aperture radar for snow and glacier surveying. *Annals of Glaciology* 9:195–199.
- Rott, H., C. Mätzler, and D. Strobl. 1986. The potential of SAR in a snow and glacier monitoring system. Paper read at SAR Applications Workshop, at Frascati, Italy.
- Rott, H., and T. Nagler. 1992. Snow and glacier investigations by ERS-1 SAR — first results. Paper read at First ERS-1 Symposium: Space at the Service of Our Environment, at Cannes.
- . 1993. Capabilities of ERS-1 SAR for snow and glacier monitoring in Alpine areas. Paper read at 2nd ERS-1 Symposium, at Hamburg.
- . 1995. Monitoring temporal dynamics of snowmelt with ERS-1 SAR. Paper read at International Geoscience and Remote Sensing Symposium, at Firenze, Italy.
- Rott, H., T. Nagler, and D-M. Floricioiu. 1995. Snow and glacier parameters derived from single-channel and multi-parameter SAR. Paper read at Extraction de paramètres biogeophysiques a partir des donnees RSO pour les applications terrestres, at Toulouse.
- Rott, H., W. Rack, P. Skvarca, and H. de Angelis. 2002. Northern Larsen Ice Shelf, Antarctica: further retreat after collapse. *Annals of Glaciology* 34:277–282.
- Rott, H., and K. Sturm. 1991. Microwave signature measurements of Antarctic and Alpine snow. Paper read at 11th EARSeL symposium. Europe: From Sea Level to Alpine Peaks, from Iceland to the Urals, at Graz, Austria.
- Rott, H., K. Sturm, and H. Miller. 1992. Signatures of Antarctic firn by means of ERS-1 AMI and by field measurements. Paper read at First ERS-1 Symposium: Space at the Service of Our Environment, at Cannes.
- . 1993. Active and passive microwave signatures of Antarctic firn by means of field measurements and satellite data. *Annals of Glaciology* 17:337–343.
- Running, S.W., J.B. Way, K.C. McDonald, J.S. Kimball, S. Frohling, A.R. Keyser, and others. 1999. Radar remote sensing proposed for monitoring freeze-thaw transitions in boreal regions. *EOS Transactions* 80 (213):220–221.
- Saich, P., W.G. Rees, and M. Borgeaud. 2001. Detecting pollution damage to forests in the Kola Peninsula using the ERS SAR. *Remote Sensing of Environment* 75:22–28.

- Salisbury, J.W., D.M. D'Aria, and A. Wald. 1994. Measurements of thermal infrared spectral reflectance of frost, snow and ice. *Journal of Geophysical Research* 99 (B12):24234–24240.
- Sandven, S., K. Kloster, and O.M. Johannessen. 1991. Remote sensing of icebergs in the Barents Sea during SIZEX 89. Paper read at First International Offshore and Polar Engineering Conference, at Edinburgh.
- Sapiano, J., W. Harrison, and K. Echelmeyer. 1998. Elevation, volume and terminus changes of nine glaciers in North America. *Journal of Glaciology* 44 (146):119–135.
- Saraf, A.K., J.L. Foster, P. Singh, and S. Tarafdar. 1999. Passive microwave data for snow-depth and snow-extent estimations in the Himalayan mountains. *International Journal of Remote Sensing* 20 (1):83–95.
- Scambos, T.A., and R. Bindschadler. 1993. Complex ice stream flow revealed by sequential satellite imagery. *Annals of Glaciology* 17:177–182.
- Scambos, T.A., M.J. Dutkiewicz, J.C. Wilson, and R.A. Bindschadler. 1992. Application of image cross-correlation to the measurement of glacier velocity using satellite image data. *Remote Sensing of Environment* 42:177–186.
- Scambos, T.A., and M.A. Fahnestock. 1998. Improving digital elevation models over ice sheets using AVHRR-based photogrammetry. *Journal of Glaciology* 44:97–103.
- Scambos, T.A., and T. Haran. 2002. An image-enhanced DEM of the Greenland ice sheet. *Annals of Glaciology* 34:291–298.
- Scambos, T.A., C. Hulbe, M. Fahnestock, and J. Bohlander. 2000. The link between climate warming and break-up of ice shelves in the Antarctic Peninsula. *Journal of Glaciology* 46 (154):516–530.
- Schaper, J., K. Seidel, and J. Martinec. 2000. Precision snow cover and glacier mapping for runoff modelling in a high alpine basin. Paper read at Remote Sensing and Hydrology, at Santa Fe.
- Scherer, D., and M. Brun. 1997. Determination of the solar albedo of snow-covered regions in complex terrain. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Schmeltz, M., E. Rignot, and D. MacAyeal. 2002. Tidal flexure along ice-sheet margins: comparison of InSAR with an elastic-plate model. *Annals of Glaciology* 34:202–208.
- Schmugge, T., T.T. Wilheit, P. Gloersen, et al. 1974. Microwave signatures of snow and freshwater ice. Paper read at Advanced Concepts and Techniques in the Study of Snow and Ice.
- Schowengerdt, R.A. 1997. *Remote Sensing: Models and Methods for Image Processing*, 2nd ed. New York: Academic Press.
- Seidel, K., C. Ehrler, J. Martinec, and O. Turpin. 1997. Derivation of statistical snow line from high resolution snow cover mapping. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Seidel, K., and J. Martinec. 1992. Operational snow cover mapping by satellites and real time runoff forecasting. Paper read at Snow and Glacier Hydrology, at Kathmandu.
- Sellmann, P.V., J. Brown, R.I. Lewellen, H. McKim, and C. Merry. 1975. The classification and geomorphic implications of thaw lakes on the Arctic coastal plain, Alaska. Hanover, New Hampshire: U.S. Army Cold Regions Research and Engineering Laboratory.

- Sellmann, P.V., W.F. Weeks, and W.J. Campbell. 1975. Use of side-looking airborne radar to determine lake depth on the Alaskan north slope. Hanover, New Hampshire: U.S. Army Cold Regions Research and Engineering Laboratory.
- Semovski, S.V., N.Y. Mogilev, and P.P. Sherstyankin. 2000. Lake Baikal ice: analysis of AVHRR imagery and simulation of under-ice phytoplankton bloom. *Journal of Marine Systems* 27 (1-3):117-130.
- Sephton, A.J., L.M.J. Brown, T.J. Macklin, K.C. Partington, N.J. Veck, and W.G. Rees. 1994. Segmentation of synthetic aperture radar imagery of sea ice. *International Journal of Remote Sensing* 15:803-825.
- Serreze, M.C., J.E. Walsh, F.S. Chapin, T. Osterkamp, M. Dyurgerov, V. Romanovsky, W.C. Oechel, J. Morison, T. Zhang, and R.G. Barry. 2000. Observational evidence of recent change in the northern high-latitude environment. *Climate Change* 46:159-207.
- Shashi Kumar, V., P.R. Paul, C.L.V. Ramana Rao, H. Haefner, and K. Seidel. 1992. Snowmelt runoff forecasting studies in Himalayan basins. Paper read at Snow and Glacier Hydrology. Proceedings published in 1993, at Kathmandu.
- Sherjal, I., M. Fily, O. Grosjean, J. Lemorton, B. Lesaffre, Y. Page, and M. Gay. 1998. Microwave remote sensing of snow from a cable car at Chamonix in the French Alps. *IEEE Transactions on Geoscience and Remote Sensing* 36 (1):324-328.
- Shi, J., and J. Dozier. 1993. Measurement of snow- and glacier-covered areas with single polarization SAR. *Annals of Glaciology* 17:72-76.
- . 1994. Estimating snow particle size using TM band 4. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- . 1995. Inferring snow wetness using C-band data from SIR-C's polarimetric synthetic aperture radar. *IEEE Transactions on Geoscience and Remote Sensing* 33 (4):905-914.
- . 1997. Mapping seasonal snow with SIR-C/X-SAR in mountainous areas. *Remote Sensing of Environment* 59 (2):294-307.
- Shi, J., J. Dozier, and R. Davis. 1990. Simulation of snow depth estimation from multi-frequency radar. Paper read at International Geoscience and Remote Sensing Symposium, at New York.
- Shi, J., J. Dozier, and H. Rott. 1994. Active microwave measurements of snow cover: progress in polarimetric SAR. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.
- Shokr, M., B. Ramsay, and J.C. Falkingham. 1992. Preliminary evaluation of ERS-1 SAR data for operational use in the Canadian sea ice monitoring program. Paper read at First ERS-1 symposium: Space at the Service of Our Environment, at Cannes.
- Shokr, M.E. 1991. Evaluation of second-order texture parameters for sea ice classification from radar images. *Journal of Geophysical Research* 96:10625-10640.
- Shuman, C.A., R.B. Alley, and S. Anandkrishnan. 1993. Characterization of a hoar-development episode using SSM/I brightness temperatures in the vicinity of the GISP2 site, Greenland. *Annals of Glaciology* 17:183-188.

- Shuman, C.A., R.B. Alley, S. Anandakrishnan, and C.R. Stearns. 1995a. An empirical technique for estimating near-surface air temperature trends in central Greenland from SSM/I brightness temperatures. *Remote Sensing of Environment* 51 (2):245–252.
- Shuman, C.A., R.B. Alley, S. Anandakrishnan, J.W.C. White, P.M. Grootes, and C.R. Stearns. 1995b. Temperature and accumulation at the Greenland summit: Comparison of high-resolution isotope profiles and satellite passive microwave brightness temperature trends. *Journal of Geophysical Research* 100:9165–9177.
- Shuman, C.A., and J.C. Comiso. 2002. In situ and satellite surface temperature records in Antarctica. *Annals of Glaciology* 34:113–120.
- Sidjak, R.W., and R.D. Wheate. 1999. Glacier mapping of the Illecillewaet icefield, British Columbia, Canada, using Landsat TM and digital elevation data. *International Journal of Remote Sensing* 20 (2):273–284.
- Singer, F.S., and R.W. Popham. 1963. Non-meteorological observations from satellites. *Astronautics and Aerospace Engineering* 1 (3):89–92.
- Skriver, H. 1989. Extraction of sea ice parameters from synthetic aperture radar images. PhD, Electromagnetics Institute, Technical University of Denmark, Copenhagen.
- Skvarca, P. 1994. Changes and surface features of the Larsen Ice Shelf, Antarctica, derived from Landsat and Kosmos mosaics. *Annals of Glaciology* 20:6–12.
- Skvarca, P., H. Rott, and T. Nagler. 1995. Satellite imagery, a baseline for glacier variation study on James Ross Island, Antarctica. *Annals of Glaciology* 21:291–296.
- Slater, M.T., D.R. Sloggett, W.G. Rees, and A. Steel. 1999. Potential operational multi-satellite sensor mapping of snow cover in maritime sub-polar regions. *International Journal of Remote Sensing* 20 (15):3019–3030.
- Smith, B.E., N.F. Lord, and C.R. Bentley. 2002. Crevasse ages on the northern margin of Ice Stream C, West Antarctica. *Annals of Glaciology* 34:209–216.
- Smith, D.M. 1998. Recent increase in the length of the melt season of perennial Arctic sea ice. *Geophysical Research Letters* 25:655–658.
- Smith, F.M., C.F. Cooper, and E.G. Chapman. 1967. Measuring snow depths by aerial photogrammetry. Paper read at 35th Western Snow Conference, at Boise, Idaho.
- Smith, L.C., R.R. Forster, B.L. Isacks, and D.K. Hall. 1997. Seasonal climatic forcings of alpine glaciers revealed with orbital synthetic aperture radar. *Journal of Glaciology* 43 (145):480–488.
- Soh, L-K., and C. Tsatsoulis. 1999. Unsupervised segmentation of ERS and Radarsat sea ice images using multiresolution peak detection and aggregated population equalization. *International Journal of Remote Sensing* 20 (15):3087–3109.
- Sohn, H-G., and K.C. Jezek. 1999. Mapping ice sheet margins from ERS-1 SAR and SPOT imagery. *International Journal of Remote Sensing* 20 (15):3201–3216.
- Sohn, H-G., K.C. Jezek, and C.J. Van der Veen. 1998. Jakobshavn Glacier, West Greenland: Thirty years of spaceborne observations. *Geophysical Research Letters* 25 (14):2699–2702.
- Solberg, R., and T. Andersen. 1994. An automatic system for operational snow-cover monitoring in the Norwegian mountain regions. Paper read at International Geoscience and Remote Sensing Symposium. Surface and Atmospheric Remote Sensing: Technologies, Data Analysis and Interpretation, at Pasadena.

- Solberg, R., D. Hiltbrunner, J. Koskinen, T. Guneriussen, K. Rautiainen, and M. Hallikainen. 1997. Snow algorithms and products — review and recommendations for research and development. SNOWTOOLS WP410. Oslo: Norwegian Computing Centre.
- Spring, W., T. Vinje, and H. Jensen. 1993. Iceberg and sea ice data obtained in the annual expeditions of the Barents Sea ice data acquisition program (IDAP). Paper read at POAC 93: Twelfth International Conference on Port and Ocean Engineering under Arctic Conditions, at Hamburg.
- Stähli, M., J. Schaper, and A. Papritz. 2002. Towards a snow-depth distribution model in a heterogeneous subalpine forest using a Landsat TM image and an aerial photograph. *Annals of Glaciology* 34:65–70.
- Stamnes, K., S-C. Tsay, W. Wiscombe, and K. Jayaweera. 1988. Numerically stable algorithm for discrete-ordinate-method radiative transfer in multiple scattering and emitting layered media. *Applied Optics* 27 (12):2502–2509.
- . 1995. Passive microwave studies of snow for the NOAA climate and global change program. Part 2. Bristol: Centre for Remote Sensing, University of Bristol.
- Standley, A.P. 1997. The use of passive microwave and optical data in the SNOWTOOLS project. Paper read at EARSeL Workshop on Remote Sensing of Land Ice and Snow, at Freiburg.
- Standley, A.P., and E.C. Barrett. 1994. Passive microwave studies of snow for the NOAA climate and global change program. Part 1. Bristol: Centre for Remote Sensing, University of Bristol.
- . 1999. The use of coincident DMSP SSM/I and OLS satellite data to improve snow cover detection and discrimination. *International Journal of Remote Sensing* 20 (2):285–305.
- Starosolszky, O., and I. Mayer. 1988. Characteristics of ice conditions based on aerial photography. Paper read at Ninth International Symposium on Ice, at Sapporo.
- Steffen, K., R. Bindschadler, G. Casassa, J. Comiso, D. Eppler, F. Fetterer, J. Hawkins, J. Key, D. Rothrock, R. Thomas, R. Weaver, and R. Welch. 1993. Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992. *Annals of Glaciology* 17:1–16.
- Steffen, K., J. Key, D.J. Cavalieri, J. Comiso, P. Gloersen, K. St Germain, and I. Rubinstein. 1992. The estimation of geophysical parameters using passive microwave algorithms. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Steffen, K., and A. Schweiger. 1991. NASA Team Algorithm for sea ice concentration retrieval from Defense Meteorological Satellite Program Special Sensor Microwave Imager: Comparison with Landsat satellite imagery. *Journal of Geophysical Research* 96:21971–21987.
- Stiles, W.H., and F.T. Ulaby. 1980a. The active and passive microwave response to snow parameters. 1. Wetness. *Journal of Geophysical Research* 85 (C2):1037–1044.
- . 1980b. Radar observations of snowpacks. *NASA Conference Publications* 2153:131–146.
- Stouffer, R., S. Manabe, and K. Bryan. 1989. Interhemipsheric asymmetry in climate response to a gradual increase of atmospheric CO₂. *Nature* 342:660–682.
- Stroeve, J., M. Haefliger, and K. Steffen. 1996. Surface temperature from ERS-1 ATSR infrared thermal satellite data in polar regions. *Journal of Applied Meteorology* 35 (8):1231–1239.

- Strozzi, T., U. Wegmuller, and C. Mätzler. 1999. Mapping wet snowcovers with SAR interferometry. *International Journal of Remote Sensing* 20 (12):2395–2403.
- Sturm, M., T.C. Grenfell, and D.K. Perovich. 1993. Passive microwave measurements of tundra and taiga snow covers in Alaska, USA. *Annals of Glaciology* 17:125–130.
- Sugden, D.E., and B.S. John. 1976. *Glaciers and Landscape*. New York: John Wiley.
- Sun, Y., A. Carlström, and J. Askne. 1992. SAR image classification of ice in the Gulf of Bothnia. *International Journal of Remote Sensing* 13:2489–2514.
- Surdyk, S. 2002. Low microwave brightness temperatures in central Antarctica: observed features and implications. *Annals of Glaciology* 34:134–140.
- Surdyk, S., and M. Fily. 1993. Comparison of microwave spectral signature of the Antarctic ice sheet with traverse ground data. *Annals of Glaciology* 17:337–343.
- Svendsen, E., K. Kloster, B. Farrelly, O.M. Johannessen, J.A. Johannessen, W.J. Campbell, P. Gloersen, D. Cavalieri, and C. Matzler. 1983. Norwegian Remote-sensing experiment — evaluation of the Nimbus-7 scanning multi-channel microwave radiometer for sea ice research. *Journal of Geophysical Research — Oceans and Atmospheres* 88 (NC5):2781–2791.
- Swamy, A.N., and P.A. Brivio. 1996. Hydrological modelling of snowmelt in the Italian Alps using visible and infrared remote sensing. *International Journal of Remote Sensing* 17 (16):3169–3188.
- Swift, C., R.F. Harrington, and F. Thornton. 1980. Airborne microwave radiometer remote sensing of lake ice. Paper read at IEEE Electronics and Aerospace Convention.
- Swithinbank, C. 1985. A distant look at the cryosphere. *Advances in Space Research* 5 (6):263–274.
- . 1988. *Satellite Image Atlas of Glaciers of the World: Antarctica*. Edited by R.S. Williams and J.G. Ferrigno. Vol. 1386-B, *U.S. Geological Survey Professional Papers*. Washington, DC: U.S. Government Printing Office.
- Swithinbank, C.W.M., E.P. McClain, and P. Little. 1977. Drift tracks of Antarctic icebergs. *Polar Record* 18 (116):495–501.
- Tait, A. 1998. Estimation of snow water equivalent using passive microwave radiation data. *Remote Sensing of Environment* 64 (3):286–291.
- Tanikawa, T., T. Aoki, and F. Nishio. 2002. Remote sensing of snow grain-size and impurities from Airborne Multispectral Scanner data using a snow bidirectional reflectance distribution function model. *Annals of Glaciology* 34:74–80.
- Tanré, D., C. Deroo, P. Duhaut, M. Herman, J.J. Morcrette, J. Perbos, and P.Y. Deschamps. 1990. Description of a computer code to simulate the satellite signal in the solar spectrum: the 5S code. *International Journal of Remote Sensing* 11 (4):659–668.
- Tchernia, P. 1974. Étude de la dérive antarctique Est-Ouest au moyen d'icebergs suivis par la satellite Éole. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* B278 (14):667–670.
- Tchernia, P., and P.F. Jeanin. 1982. Some aspects of the Antarctic ocean circulation revealed by satellite tracking of icebergs. *Iceberg Research* 2:4–5.
- Thomas, A., and D.G. Barber. 1998. On the use of multi-year ice ERS-1 σ^0 as a proxy indicator of melt period sea ice albedo. *International Journal of Remote Sensing* 19 (14):2807–2821.

- Thomas, R., W. Krabill, E. Frederick, and K. Jezek. 1995. Thickening of Jakobshavns Isbrae, West Greenland, measured by airborne laser altimetry. *Annals of Glaciology* 21:259–262.
- Thomas, R.H. 1993. Ice sheets. In *Atlas of Satellite Observations Related to Global Change*, edited by R.J. Gurney, J.L. Foster and C.L. Parkinson. Cambridge: Cambridge University Press.
- Tinga, W.R., W.A.G. Voss, and D.F. Blossey. 1973. Generalized approach to multi-phase dielectric mixture theory. *Journal of Applied Physics* 44:3897–3902.
- Tsang, L., Z.X. Chen, S. Oh, R.J. Marks, and A.T.C. Chang. 1992. Inversion of snow parameters from passive microwave remote-sensing measurements by a neural network trained with a multiple-scattering model. *IEEE Transactions on Geoscience and Remote Sensing* 30 (5):1015–1024.
- Tucker, W.B., D.K. Perovich, A.J. Gow, W.F. Weeks, and M.R. Drinkwater. 1992. Physical properties of sea ice relevant to remote sensing. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington, DC: American Geophysical Union.
- Ulaby, F.T., R.K. Moore, and A.K. Fung. 1982. *Microwave Remote Sensing — Active and Passive. Volume 2: Radar remote sensing and surface scattering and emission theory*. Reading, Massachusetts: Addison-Wesley.
- Ulaby, F.T., R.K. Moore, and A.K. Fung. 1986. *Microwave Remote Sensing — Active and Passive. Volume 3: From theory to applications*. Reading, Massachusetts: Artech House.
- Ulaby, F.T., W.H. Stiles, and M. Abdelrazik. 1984. Snowcover influence on backscattering from terrain. *IEEE Transactions on Geoscience and Remote Sensing* GE22:126–133.
- Ulander, L.M.H. 1991. Radar remote sensing of sea ice: Measurements and theory. In *Technical report*. Göteborg: Chalmers University of Technology.
- Unesco/IAHS/WMO. 1970. Seasonal snow cover. In *Technical Papers in Hydrology*. Paris: Unesco/IAHS/WMO.
- Unwin, B., and D. Wingham. 1997. Topography and dynamics of Austfonna, Nordaustlandet, Svalbard, from SAR interferometry. *Annals of Glaciology* 24:402–408.
- van de Wal, R.S.W., J. Oerlemans, and J. van der Hage. 1992. A study of ablation variations on the tongue of Hinterschferner, Austrian Alps. *Journal of Glaciology* 38 (130):319–324.
- van der Veen, C.J., and K.C. Jezek. 1993. Seasonal variations in brightness temperature for central Antarctica. *Annals of Glaciology* 17:300–306.
- Vaughan, D.G., J.L. Bamber, M.B. Giovinetto, J. Russell, and A.P.R. Cooper. 1999. Reassessment of net surface mass balance in Antarctica. *Journal of Climate* 12 (4):933–946.
- Vefsnmo, S., S.M. Løvas, S. Løset, and T. Næss. 1989. Identification and volume estimation of icebergs by remote sensing in the Barents Sea. Paper read at IGARSS 89: Twelfth Canadian Symposium on Remote Sensing. Quantitative Remote Sensing: an Economic Tool for the Nineties, at Vancouver.
- Venkatesh, S., B. Sanderson, and M.S.S. El-Tahan. 1990. Optimum deployment of satellite-tracked drifters to support iceberg drift forecasting. *Cold Regions Science and Technology* 18 (2):117–131.
- Vermote, E.F., and A. Vermeulen. 1999. *Atmospheric Correction Algorithm: Spectral Reflectances MOD09*. U.S. National Aeronautics and Space Administration.

- (Cited 2003). Available from <http://modis.gsfc.nasa.gov/MODIS/Data/ATBDs/atbd.mod08.pdf>.
- Vesecky, J.F., R. Samadani, M.P. Smith, J.M. Daida, and R.N. Bracewell. 1988. Observations of sea-ice dynamics using synthetic aperture radar images: automated analysis. *IEEE Transactions on Geoscience and Remote Sensing* GE26 (1):38–48.
- Vesecky, J.F., M.P. Smith, and R. Samadani. 1990. Extraction of lead and ridge characteristics from SAR images of sea ice. *IEEE Transactions on Geoscience and Remote Sensing* GE28 (4):740–744.
- Vikhamar, D., and R. Solberg. 2000. A method for snow-cover mapping in forest by optical remote sensing methods. Paper read at EARSeL Specialist Workshop on Remote Sensing of Land and Snow, Proceedings published in 2001, at Dresden.
- Vinje, T. 1989. Icebergs in the Barents Sea. Paper read at Eighth International Conference on Offshore Mechanics and Arctic Engineering, at The Hague.
- Vogel, S.W. 2002. Usage of high-resolution Landsat-7 band 8 for single-band snow-cover classification. *Annals of Glaciology* 34:53–57.
- Vornberger, P.L., and R.A. Bindschadler. 1992. Multi-spectral analysis of ice sheets using coregistered SAR and TM imagery. *International Journal of Remote Sensing* 13:637–645.
- Voss, S., G. Heygster, and R. Ezraty. 2003. Improving sea ice type discrimination by the simultaneous use of SSM/I and scatterometer data. *Polar Research* 22:35–42.
- Wadhams, P., and J.C. Comiso. 1992. The ice thickness distribution inferred using remote sensing techniques. In *Microwave Remote Sensing of Sea Ice*, edited by F.D. Carsey. Washington DC: American Geophysical Union.
- Wadhams, P., and N.R. Davis. 2000. Further evidence of sea ice thinning in the Arctic Ocean. *Geophysical Research Letters* 27 (24):3973–3976.
- Wadhams, P., W.B. Tucker, W.B. Krabill, R.N. Swift, J.C. Comiso, and N.R. Davis. 1992. Relationship between sea ice freeboard and draft in the Arctic Basin, and implications for thickness monitoring. *Journal of Geophysical Research* 97 (C12):20325–20334.
- Wakabayashi, H., M.O. Jeffries, and W.F. Weeks. 1992. C-band backscatter from ice on shallow tundra lakes: observations and modelling. Paper read at First ERS-1 Symposium: Space at the Service of Our Environment, at Cannes.
- Walker, A.E., and B.E. Goodison. 1993. Discrimination of a wet snowcover using passive microwave satellite data. *Annals of Glaciology* 17:307–311.
- Walker, A.E., and A. Silis. 2002. Snow-cover variations over the Mackenzie River basin, Canada, derived from SSM/I passive-microwave satellite data. *Annals of Glaciology* 34:8–14.
- Wang, J., and W. Li. 2001. Establishing snowmelt runoff simulating model using remote sensing data and GIS in the west of China. *International Journal of Remote Sensing* 22 (17):3267–3274.
- Wang, S.L., H.J. Jin, S. Li, and L. Zhao. 2000. Permafrost degradation on the Qinghai-Tibet Plateau and its environmental impacts. *Permafrost and Periglacial Processes* 11:43–53.
- Warren, C.R., and D.E. Sugden. 1993. The Patagonian icefields: a glaciological review. *Arctic and Alpine Research* 25 (4):316–331.
- Warren, S.G. 1982. Optical properties of snow. *Reviews of Geophysics and Space Physics* 20 (1):67–89.

- . 1984. Optical constants of ice from the ultraviolet to the microwave. *Applied Optics* 23:1026–1225.
- Warren, S.G., and W.J. Wiscombe. 1980. A model for the spectral albedo of snow. II. Snow containing atmospheric aerosols. *Journal of Atmospheric Science* 37 (12):2734–2745.
- Washburn, A.L. 1980. Permafrost features as evidence of climate change. *Earth-Sciences Review* 15:327–402.
- Watanabe, O. 1978. Distribution of surface features of snow cover in Mizuho plateau. *Memoirs of the National Institute for Polar Research* Special issue 7:154–181.
- Watkins, A.B., and I. Simmonds. 2000. Current trends in Antarctic sea ice: the 1990s impact on a short climatology. *Journal of Climate* 13 (24):4441–4451.
- Weeks, W.F., and S.F. Ackley. 1986. The growth, structure and properties of sea ice. In *The Geophysics of Sea Ice*, edited by N. Untersteiner. New York: Plenum Press.
- Weeks, W.F., A.G. Fountain, M.L. Bryan, and C. Elachi. 1978. Differences in radar return from ice-covered North Slope lakes. *Journal of Geophysical Research* 83:4069–4073.
- Weeks, W.F., P.V. Sellmann, and W.J. Campbell. 1977. Interesting features of radar imagery of ice-covered North Slope lakes. *Journal of Glaciology* 18:129–136.
- Weidick, A. 1995. *Satellite Image Atlas of Glaciers of the World: Greenland*. Edited by R.S. Williams and J.G. Ferrigno. Vol. 1386, *U.S. Geological Survey Professional Papers*. Washington DC: U.S. Government Printing Office.
- Welch, H. 1991. Comparisons between lakes and seas during the Arctic winter. *Arctic and Alpine Research* 23 (1):11–23.
- Welch, H.E., J.A. Legault, and M.A. Bergmann. 1987. Effects of snow and ice on the annual cycles of heat and light in Saqvaquac Lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 44:1451–1461.
- Wendler, G., K. Ahlnäs, and C.S. Lingle. 1996. On Mertz and Ninnis Glaciers, East Antarctica. *Journal of Glaciology* 42 (142):447–453.
- Wessels, R.L., J.S. Kargel, and H.H. Kieffer. 2002. ASTER measurement of supraglacial lakes in the Mount Everest region of the Himalaya. *Annals of Glaciology* 34:399–408.
- Whillans, I.M., and S.J. Johnsen. 1983. Longitudinal variations in glacial flow: theory and test using data from the Byrd Station strain network, Antarctica. *Journal of Glaciology* 29 (101):78–97.
- Whillans, I.M., and Y. Tseng. 1995. Automatic tracking of crevasses on satellite images. *Cold Regions Science and Technology* 23:201–214.
- Wiesnet, D.R. 1979. Satellite studies of fresh-water ice movement on Lake Erie. *Journal of Glaciology* 24:415–426.
- Willey, R.L. 1975. Generalized photoclimate for Mariner 9. *Icarus* 25:613–626.
- Williams, P.J., and M.W. Smith. 1989. *The Frozen Earth: Fundamentals of Geocryology*. Cambridge: Cambridge University Press.
- Williams, R.N., W.G. Rees, and N.W. Young. 1999. A technique for the identification and analysis of icebergs in synthetic aperture radar images of Antarctica. *International Journal of Remote Sensing* 20 (15):3183–3199.
- Williams, R.N., K.J. Michael, S. Pendlebury, and P. Crowther. 2002. An automated image analysis system for detecting sea-ice concentration and cloud cover from AVHRR images of the Antarctic. *International Journal of Remote Sensing* 23 (4):611–625.

- Williams, R.S., J.G. Ferrigno, C. Swithinbank, B.K. Lucchitta, and B.A. Seekins. 1995. Coastal-change and glaciological maps of Antarctica. *Annals of Glaciology* 21:284–290.
- Williams, R.S., and D.K. Hall. 1993. Glaciers. In *Atlas of Satellite Observations Related to Global Change*, edited by R.J. Gurney, J.L. Foster and C.L. Parkinson. Cambridge: Cambridge University Press.
- Williams, R.S., D.K. Hall, and C.S. Benson. 1991. Analysis of glacier facies using satellite techniques. *Journal of Glaciology* 37 (125):120–128.
- Willis, C.J., J.T. Macklin, K.C. Partington, K.C. Teleki, and W.G. Rees. 1996. Iceberg detection using ERS-1 synthetic aperture radar. *International Journal of Remote Sensing* 17 (9):1777–1795.
- Wilson, L.L., L. Tsang, J.N. Hwang, and C.T. Chen. 1999. Mapping snow water equivalent by combining a spatially distributed snow hydrology model with passive microwave remote-sensing data. *IEEE Transactions on Geoscience and Remote Sensing* 37 (2):690–704.
- Winebrenner, D.P., E.D. Nelson, R. Colony, and R.D. West. 1994. Observation of melt onset on multi-year Arctic sea ice using the ERS-1 synthetic aperture radar. *Journal of Geophysical Research* 99:22425–22441.
- Wingham, D.J. 1995. The limiting resolution of ice-sheet elevations derived from pulse-limited satellite altimetry. *Journal of Glaciology* 41:413–422.
- Wingham, D.J., A.L. Ridout, R. Scharroo, R.J. Arthern, and C.K. Shum. 1998. Antarctic elevation change 1992 to 1996. *Science* 282 (5388):456–458.
- Winsor, P. 2001. Arctic sea ice thickness remained constant during the 1990s. *Geophysical Research Letters* 28 (6):1039–1041.
- Winther, J-G. 1993. Landsat TM derived and in situ summer reflectance of glaciers in Svalbard. *Polar Research* 12 (1):37–55.
- Winther, J-G., and D.K. Hall. 1999. Satellite-derived snow coverage related to hydropower production in Norway: present and future. *International Journal of Remote Sensing* 20 (15):2991–3008.
- Wiscombe, W.J., and S.G. Warren. 1980. A model for the spectral albedo of snow. 1: pure snow. *Journal of Atmospheric Science* 37:2712–2733.
- Wismann, V. 2000. Monitoring of seasonal snowmelt on Greenland with ERS scatterometer data. *IEEE Transactions on Geoscience and Remote Sensing* 38 (4):1821–1826.
- Wunderle, S., and J. Schmidt. 1997. Comparison of interferograms using different DTM's — a case study of the Antarctic Peninsula. In *Proceedings of the EARSeL Workshop Remote Sensing of Land Ice and Snow*, edited by S. Wunderle. Saint-Étienne, France: European Association of Remote Sensing Laboratories.
- Wynne, R.H., and T.M. Lillesand. 1993. Satellite observation of lake ice as a climate indicator — initial results from statewide monitoring in Wisconsin. *Photogrammetric Engineering and Remote Sensing* 59 (6):1023–1031.
- Xiao, X., Z. Shen, and X. Qin. 2001. Assessing the potential of VEGETATION sensor data for mapping snow and ice cover: a normalized difference snow and ice index. *International Journal of Remote Sensing* 22 (13):2479–2487.
- Xin, L., T. Koike, and C. Guodong. 2002. Retrieval of snow reflectance from Landsat data in rugged terrain. *Annals of Glaciology* 34:31–37.
- Xu, H., J.O. Bailey, E.C. Barrett, and R.E.J. Kelly. 1993. Monitoring snow area and depth with integration of remote-sensing and GIS. *International Journal of Remote Sensing* 14 (17):3259–3268.

- Yankielun, N.E., S.A. Arcone, and R.K. Crane. 1992. Thickness profiling of freshwater ice using millimeter-wave FM-CW radar. *IEEE Transactions on Geoscience and Remote Sensing* 30 (5):1094–1100.
- Yankielun, N.E., M.G. Ferrick, and P.B. Weyrick. 1993. Development of an airborne millimeter-wave FM-CW radar for mapping river ice. *Canadian Journal of Civil Engineering* 20 (6):1057–1064.
- Yi, D., and C.R. Bentley. 1994. Analysis of satellite radar altimeter return waveforms over the east Antarctic ice sheet. *Annals of Glaciology* 20:137–142.
- Young, N.W., and G. Hyland. 2002. Velocity and strain rates derived from InSAR analysis of the Amery Ice Shelf, East Antarctica. *Annals of Glaciology* 34:228–234.
- Zhang, T., R.G. Barry, K. Knowles, J.A. Heginbottom, and J. Brown. 1999. Statistics and characteristics of permafrost and ground ice distribution in the Northern Hemisphere. *Polar Geography* 23 (2):147–169.
- Zhang, Y. 1999. *MODIS UCSB Emissivity Library*. Available from <http://www.icesc-ucsb.edu/modis/EMIS/html/em.html>.
- Zibordi, G., and G.P. Meloni. 1991. Classification of Antarctic surfaces using AVHRR data — a multispectral approach. *Antarctic Science* 3 (3):333–338.
- Zibordi, G., and M. van Woert. 1993. Antarctic sea ice mapping using the AVHRR. *Remote Sensing of Environment* 45:155–163.
- Zwally, H.J. 1977. Microwave emissivity and accumulation rate of polar firn. *Journal of Glaciology* 18:195–215.
- Zwally, H.J., M.A. Beckley, A.C. Brenner, and M.B. Giovinetto. 2002. Motion of ice-shelf fronts in Antarctica from slant-range analysis of radar altimeter data, 1978–98. *Annals of Glaciology* 34:255–262.
- Zwally, H.J., and A.C. Brenner. 2001. The role of satellite radar altimetry in the study of ice sheet dynamics and mass balance. In *Satellite Altimetry and Earth Sciences*, edited by L.-L. Fu. New York: Academic Press.
- Zwally, H.J., A.C. Brenner, J.A. Major, R.A. Bindshadler, and J.G. Marsh. 1989. Growth of Greenland Ice Sheet: Measurement. *Science* 246:1587–1589.
- Zwally, H.J., and S. Fiegles. 1994. Extent and duration of Antarctic surface melt. *Journal of Glaciology* 40 (136):463–476.
- Zwally, H.J., and M.B. Giovinetto. 1995. Accumulation in Antarctica and Greenland derived from passive-microwave data: A comparison with contoured complications. *Annals of Glaciology* 21:123–130.
- Zwally, H.J., and P. Gloersen. 1977. Passive microwave images of the polar regions and research applications. *Polar Record* 18 (116):431–450.