

References

- Abel, P. (1990) *Report of the Workshop on Radiometric Calibration of Satellite Sensors of ARPEGE-Climate*, 1996.
- Abel, P., Guenther, B., Galimore, R. N. and Cooper, J. W. (1993) Calibration results for NOAA-11 AVHRR channels 1 and 2 by congruent path measurements. *Journal of Atmospheric and Oceanic Technology* **10**, 493–508.
- Agrawala, S. (1999) Early science-policy interactions in climate change: lessons from the Advisory Group on Greenhouse Gases. *Global Environmental Change* **9**, 157–169.
- Allen, M. R., Mutlow, C. T., Blumberg, G. M. C., Christy, J. R., McNider, R. T. and Llewellyn-Jones, D. T. (1994) Global change detection. *Nature* **370**, 24–25.
- Arrhenius, S. (1896) On the influence of carbonic acid in the air upon the temperature of the ground. *Philosophical Magazine* **41**, 237–276.
- Avissar, R. and Verstraete, M. M. (1990) The representation of continental surface processes in atmospheric models. *Reviews of Geophysics* **28**, 35–52.
- Baer, F. (1977) Adjustments of initial conditions required to suppress gravity oscillations in non-linear flows. *Beiträge zur Physik der Atmosphäre* **50**, 350–366.
- Baily, R. G. and Hogg, H. C. (1986) A world ecoregions map for resource reporting. *Environmental Conservation* **13**, 195–202.
- Barbosa, P. M., Pereira, J. M. C. and Grégoire, J.-M. (1998) Compositing criteria for burned area assessment using multitemporal low resolution satellite data. *Remote Sensing of Environment* **65**, 38–49.
- Barkstrom, B. (1973) A comparison of Minnaert reflectance law and the reflectance from a non-conservative isotropic scattering atmosphere. *Journal of Geophysical Research* **78**, 6370–6372.
- Barrett, J. (1996) Do CO₂ emissions pose a global threat? In: J. Emsley (ed.), *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 60–70.
- Barry, R. G. and Chorley, R. J. (1998) *Atmosphere, Weather and Climate* (7th edn). Routledge, London.
- Bate, R. (1998) *Global Warming – the Continuing Debate*. The European Science and Environment Forum, London.
- Bate, R. and Morris, J. (1994) *Global Warming – Apocalypse or Hot Air?* IEA Studies on the Environment No. 1. Institute of Economic Affairs, London.

- Belward, A. S. (ed.) (1996a) *The IGBP-DIS Global 1 km Land Cover Data Set 'DISCover' Proposal and Implementation Plans*, Report of the Land Cover Working Group of IGBP-DIS, IGBP-DIS Working Paper No. 13. IGBP DIS Office, Toulouse, France.
- Belward, A. S. (1996b) AVHRR data sets for global terrestrial ecosystem monitoring. In: G. D'Souza, A. S. Belward and J-P. Malingreau (eds), *Advances in the use of AVHRR data for Land Applications*. Kluwer Academic, Dordrecht, pp. 455–470.
- Belward, A. S. (1999) International co-operation in satellite sensor calibration; the role of the CEOS working group on calibration and validation. *Advances in Space Research* **23**, 1443–1448.
- Berk, A., Bernstein, L. S. and Robertson, D. C. (1989) *MODTRAN: A moderate resolution model for LOWTRAN 7*, Report GL-TR-89-0122. Hanscom Air Force Base, MA, Geophysics Laboratory.
- Berreen, J. and Meyer, A. (1992) A package marked 'Return to sender'. Some problems with the Climate Convention. *Network '92* **18**, 6–7.
- Boehmer-Christiansen, S. (1996) Political pressure in the formation of scientific consensus. In: J. Emily (ed.) *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 234–248.
- Bowyer, S., Zeitland, G., Tarter, J., Lampton M. and Welch, J. (1983) The Berkeley Parasitic SETI program. *Icarus* **53**, 147–155.
- Brest, C. L. and Rossow, W. B. (1992) Radiometric calibration and monitoring of NOAA AVHRR data for ISSCP. *International Journal of Remote Sensing* **13**, 235–273.
- Brest, C. L., Rossow, W. B. and Roiter, M. (1997) Update of radiance calibrations for ISSCP. *Journal of Atmospheric and Oceanic Technology* **14**, 1091–1109.
- Brown, J. F., Loveland, T. R., Merchant, J. W., Reed, B. C., and Ohlen, D. O. (1993) Using multisource data in global land characterization: concepts, requirements, and methods. photogrammetric engineering and remote sensing **59**, 977–987.
- Brown, J. W., Brown, O.B. and Evans, R.H. (1993) Calibration of advanced very high resolution radiometer: a new approach. *Journal of Geophysical Research* **98**, 18257–18268.
- Brown, L. R., Renner, M. and Halweil, B. (1999) *Vital Signs 1999*. W.W. Norton, New York.
- Brown, O. B., Brown, J. W. and Evans, R. H. (1985) Calibration of advanced very high resolution radiometer infrared observations. *Journal of Geophysical Research* **90**, 11667–11677.
- Buckley, R. (1994) *World Population: The Biggest Problem of All?* European Schoolbooks Publishing Limited, Cheltenham.
- Butcher, S. S., Charlson, R. J. Orians G. H. and Wolf, G.V. (1992) *Global Biogeochemical Cycles*. Academic Press, London, p. 380.
- CEOS (1995) *Leadership to Ensure High-quality Earth Observation Data: A Strategic Vision*. Ispra, Varese, Italy, The CEOS Working Group on Calibration and Validation, Secretariat Space Applications Institute, DG-JRC, 32 pp.
- Chahine, M. T. (1992) The hydrological cycle and its influence on climate. *Nature* **359**, 373–380.
- Charney, J. G. (1975) Dynamics of desert and drought in the Sahel. *Quarterly Journal of the Royal Meteorological Society* **101**, 193–202.
- Che, N. and Price, J. C. (1992) Survey of radiometric calibration results and methods for visible and near-infrared channels of NOAA-7, -9, and -11 AVHRRs. *Remote Sensing of Environment* **41**, 19–27.
- CIESIN (Center for International Earth Science Information Network) (1998) *Environmental Treaties and Resource Indicators (ENTRI)* [online]. Palisades, NY, CIESIN. URL: <http://www.ciesin.org>

- Cihlar, J., Belward, A. S., and Govaerts, Y. (eds) (1999) *METEOSAT Second Generation Opportunities for Land Surface Applications and Research*. EUMETSAT Scientific Publications, Darmstadt, 63 pp.
- Cobb, J., Donnelly, C., Bowyer, S., Werthimer, D. and Lampton, M. (1997) The SERENDIP IV interference rejection and signal detection system. In: C. B. Cosmovici, S. Bowyer and D. Werthimer (eds), *Astronomical and Biochemical Origins and the Search for Life in the Universe (Proceedings of the Fifth International Conference on Bioastronomy, Capri, 1–5 July, 1996)*, IAU Colloquium No. 161. Editrice Compositori, Bologna, pp. 677–682.
- Congalton, R. G. (1991) A review of assessing the accuracy of classifications of remotely sensed data. *Remote Sensing of Environment* **37**, 35–46.
- Corbyn, P. (1996) Carbon dioxide fluctuations resulting from climate change. In: J. Emsley (ed.), *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 71–78.
- Cosnefroy, H., Briottet, X. and Leroy, M. (1993) Characterization of desert areas with METEOSAT 4 data for the calibration of optical satellite sensors. In: P. S. Chavez and R. A. Schowengerdt (eds), *Proceedings of SPIE Conference on Recent Advances in Sensors, Radiometric Calibration, and Processing of Remotely Sensed Data*. SPIE, Bellingham, Washington, DC, pp. 203–211.
- Courtier, P., Thépaut, J.-N. and Hollingsworth, A. (1994) A strategy for operational implementation of 4D-Var, using an incremental approach. *Quarterly Journal of the Royal Meteorological Society* **120**, 1367–89.
- Cracknell, A. P. (1994a) Climate change – the background. In: R. A. Vaughan and A. P. Cracknell (eds), *Remote Sensing and Global Climate Change*. Springer, Berlin, pp. 1–33.
- Cracknell, A. P. (1994b) Basis and structure of climate models. In: R. A. Vaughan and A. P. Cracknell (eds), *Remote Sensing and Global Climate Change*, Springer, Berlin, pp. 135–176.
- Cracknell, A. P. (1997) *The Advanced Very High Resolution Radiometer*. London, Taylor and Francis, 534 pp.
- Crutzen, P. J. and Andreae, M. O. (1990) Biomass burning in the tropics: impact on atmospheric chemistry and biogeochemical cycles. *Science* **250**, 1669–1678.
- Daley, R. (1991) *Atmospheric Data Analysis*. Cambridge University Press, Cambridge.
- Danko, D. M. (1992) The digital chart of the world. *Geoinfosystems* **2**, 29–36.
- De Boissezon, H., Gonzales, G., Pous, B. and Sharman, M. (1993) Rapid estimates of crop acreage and production at a European scale using high resolution imagery – operational review. *Proceedings of the International Symposium on Operationalization of Remote Sensing, held at Enschede, The Netherlands, 19–23 April 1993*. International Institute for Aerospace Survey and Earth Sciences, Enschede, vol. 2, pp. 94–105.
- De Grandi, G. F., Mayaux, P., Malingreau, J.-P., Rosenqvist, Å., Saatchi, S. and Simard, M. (2000) New perspectives on global ecosystems from wide-area radar mosaics: flooded forest mapping in the Tropics. *International Journal of Remote Sensing* **21**, 1235–1249.
- Dee, D., Cohn, S., Dalcher, A. and Ghil, M. (1985) An efficient algorithm for estimating noise covariances in distributed systems. *IEEE Transactions on Automatic Control* **30**, 1057–1065.
- DeFries, R. S. and Belward, A. S. (2000) Global and regional land cover characterization from satellite data: an introduction to the Special Issue. *International Journal of Remote Sensing* **21**, 1083–1092.
- Dignon, J. and Penner, J. E. (1991) Biomass burning: a source of nitrogen oxides in the atmosphere. In: J. S. Levine (ed.), *Global Biomass Burning, Atmospheric Climatic and Biospheric Implications*. The MIT Press, Cambridge, MA, pp. 370–375.

- Diner, D. J., Gregory, P., Asner, P., Davies, R., Knyazikhin, Y., Muller, J-P., Nolin, A.W., Pinty, B., Schaaf, C.B. and Stroeve, J. (1999) New directions in Earth observing: scientific applications of multi-angle remote sensing. *Bulletin of the American Meteorological Society* **80**, 2209–2228.
- Djepa, V. (1993) Determination of clouds parameters from ATSR/ERS1 data. *Proceedings of the 13th Annual EARSeL Symposium, Dundee, UK, 29 June–1 July 1993*. Springer, Budapest, pp. 393–400.
- Djepa V. and Harwood, R. (1998) Impact of atmospheric and surface variables on sea surface heat fluxes, based on modelling and satellite information, COSPAR, Birmingham. *Advances in Space Research* **22**(5), 697–700.
- Djepa V. and Vaughan, R. A. (2000) Retrieval of land-atmosphere interactive processes and variables from the Along Track Scanning Radiometer (ATSR-2) on board ERS-2. *International Journal of Remote Sensing*, in press.
- Dwyer, E., Pinnock, S., Grégoire, J-M. and Pereira, J. M. C. (2000) Global spatial and temporal distribution of vegetation fire as determined from satellite observations. *International Journal of Remote Sensing* **21**, 1289–1302.
- Easterling, D.R., Evans, J.L., Groisman, P.Ya., Karl, T.R., Kunkel, K.E. and Ambenje, P., 2000: Observed variability and trends in extreme climate events, a brief review. *Bulletin of the American Meteorological Society*, **81**, 417–425.
- EC (1999) *Official Journal of the European Communities*, **128**, 92–96.
- Eidenshink, J. E., and Faundeen, J. L. (1994) The 1 km AVHRR global land data set: first stages in implementation. *International Journal of Remote Sensing* **15**, 3443–3462.
- Emsley, J. (1996) *The Global Warming Debate*. The European Science and Environment Forum, London.
- Emsley, J. (1998) Introduction. In: R. Bate (ed.), *Global Warming – the Continuing Debate*. The European Science and Environment Forum, London, pp. 22–26.
- EOS (1999) Science plan. In: R. Greenstone and M. D. King (eds), *The State of Science in the EOS Program*, NASA Goddard Space Flight Center, Greenbelt, MD, 397 pp.
- ESA (1998a) *The Living Planet Programme – Call for Core Missions*, SP-1196. European Space Agency, Noordwijk.
- ESA (1998b) *The Living Planet Programme – Call for Earth Explorer Opportunity Missions*, SP-1226. European Space Agency, Noordwijk.
- ESA (1998c) *The Earth Explorers: The Science and Research Elements of ESA's Living Planet Programme*, SP-1227. Noordwijk, European Space Agency.
- ESA (1998d) *Further Achievements of the ERS Missions*, SP-1228. European Space Agency, Noordwijk.
- ESA (1998e) *Envisat Mission – Opportunities and Applications*, SP-1218. European Space Agency, Noordwijk.
- ESA (1998f) *Taking Nature's Pulse – Europe's ERS Satellites*, BR-134. European Space Agency, Noordwijk.
- ESA (1999) *Introducing the ESA 'Living Planet Programme': The ESA Strategy for Earth Observation*, SP-1234. Noordwijk, European Space Agency.
- Estes, J. E., and Mooneyhan, W. (1994) Of maps and myths. *Photogrammetric Engineering and Remote Sensing* **60**, 517–524.
- Fisher, M. and Lary, D. J. (1995) Lagrangian four-dimensional variational data assimilation of chemical species. *Quarterly Journal of the Royal Meteorological Society* **121**, 1681–1704.
- Fourier, J. B. J. (1824) Remarques générales sur les températures du globe terrestre et des espaces planétaires. *Annales de Chimie et de Physique* **27**, 136–167.

- Geitelson, A., and M.N. Merzlyak, 1994: Quantitative estimation of chlorophyll-a using reflectance spectra. *Journal of Photochemistry and Photobiology: B (Biology)* **22**, 247–252.
- Ghil, M., Cohn, S., Tavantzis, J., Bube, K. and Isaacson, E. (1981) Applications of estimation theory to numerical weather prediction. In: L. Bengtsson, M. Ghil and E. Kèallen (eds.), *Dynamic Meteorology: Data Assimilation Methods*, Springer Verlag, New York, pp. 139–224.
- Gibson, J. K., Kallberg, P., Uppala, S., Hernandez, A., Nomura, A. and Serrano, E. (1997) *ERA Description*, ECMWF re-analysis project report series, 1. European Centre for Medium Range Weather Forecasts, Reading.
- Gille, J. C. (1984) *Middle Atmosphere Science*, NASA Technical Memorandum 86129, vol. 1 (part. 2). Goddard Space Flight Center, Greenbelt, MD, pp. 49–52.
- Gobron, N., Pinty, B., Verstraete, M. and Govaerts, Y. (1999) The MERIS Global Vegetation Index (MGVI): description and preliminary application. *International Journal of Remote Sensing* **20**, 1917–1927.
- Goodess, C.M., Palutikof, J.P. and Davies, T.D., 1992: *The Nature and Causes of Climatic Change: Assessing the Long-term Future*. Belhaven Press, London, 248pp.
- Gordon, C., Cooper, C., Senior, C.A., Banks, H., Gregory, J.M., Johns, T.C., Mitchell, J.F.B. and Wood, R., 2000: The simulation of SST, sea ice extents and ocean heat transports in a version of the Hadley Centre coupled model without flux adjustments. *Climate Dynamics*, **16**, 147–168.
- Gore, A. (1993) *Earth in the Balance. Ecology and the Human Spirit*. Dutton Plume, New York.
- Gribbin, J. (1978) *The Climate Threat*. Fontana/Collins, Glasgow.
- Gribbin, J. (1988) *The Hole in the Sky – Man's Threat to the Ozone Layer*. Corgi, London.
- Gribbin, J. (1990) An assault on the climate consensus. *New Scientist*, 15 December 1990, 26–31.
- Grubb, M., Koch, M., Thomson, K., Munsen, A. and Sullivan F. (1993) *The Earth Summit Agreements: A Guide and Assessment*. Royal Institute of International Affairs/Earthscan, London.
- Grubb, M., Vrolijk, C. and Brack, D. (1999) *The Kyoto Protocol – A Guide and Assessment*. Royal Institute of International Affairs/Earthscan, London.
- Gruber, A. and Winston, J. S. (1978) Earth-atmosphere radiative heating based on NOAA scanning radiometer measurements. *Bulletin of the American Meteorological Society* **59**, 1570–1573.
- Gutman, G. (1999a) On the use of long-term global data of land reflectances and vegetation indices derived from the Advanced Very High Resolution Radiometer. *Journal of Geophysical Research* **104**, 6241–6255.
- Gutman, G. (1999b) On the monitoring of land surface temperatures with the NOAA/AVHRR: Removing the effect of satellite orbit drift. *International Journal of Remote Sensing* **20**, 3407–3413.
- Hanson, M. C., Defries, R. S., Townshend, J. R. G. and Sohlberg, R. (2000) Global land cover classification at 1 km spatial resolution using a classification tree approach. *International Journal of Remote Sensing* **21**, 1331–1364.
- Hay, A. M. (1988) The derivation of global estimates from a confusion matrix. *International Journal of Remote Sensing* **9**, 1395–1398.
- Henry, P., Dingirard, M. and Bodilis, M. (1993) Multispectral calibration over desert areas. *Bulletin of the American Meteorological Society* **67**–76.
- Holdgate, M. (1995) How can development be sustainable? *RSA Journal* **143**(5464), November, 15–29.

- Houghton, J. T. (ed.) (1984) *The Global Climate*. Cambridge University Press, Cambridge.
- Houghton, J. T. (1991) The Bakerian Lecture 1991, the predictability of weather and climate. *Philosophical Transactions of the Royal Society of London* **A337**, 521–572.
- Houghton, J. T. (1997) *Global Warming – the Complete Briefing*. Cambridge University Press, Cambridge.
- Houghton, J. T., Callander, B. A. and Varney, S. K. (1992) *Climate Change – the Supplementary Report to the IPCC Scientific Assessment*. Cambridge, Cambridge University Press.
- Houghton, J. T., Jenkins, G. J. and Ephraums, J. J. (1990) *Climate Change – the IPCC Scientific Assessment*. Cambridge University Press, Cambridge.
- Houghton, J. T., Meira Filho, L.G., Bruce, J., Lee Hoesung, Callander, B. A., Haites, E., Harris, N. and Maskell, K. (1994) *Climate Change 1994 – Radiative Forcing of Climate Change and an Evaluation of the IPCCIS92 Emission Scenarios*. Cambridge University Press, Cambridge.
- Houghton, J. T., Meira Filho, L. G., Callander, B. A., Harris, N., Kattenberg, A and Maskell, K. (1996) *Climate Change 1995 – the Science of Climate Change*. Cambridge University Press, Cambridge.
- Houghton, R. A., Skole, D. L. and Lefkowitz, D. S. (1991) Changes in the landscape of Latin America between 1850 and 1985. II. A net release of CO₂ to the atmosphere. *Journal of Forest Ecology and Management* **38**, 173–199.
- Hulme, M., Mitchell, J., Ingram, W., Lowe, J., Johns, T., New, M. and Viner, D., 1999: Climate change scenarios for global impacts studies. *Global Environmental Change*, 9, S3-S19.
- Ignatov, A and Gutman, G. (1999) Monthly mean diurnal cycles in surface temperatures over land for global climate studies. *J. Climate* **12**, 1900–1910.
- IGOS (1999) *An Integrated Global Observing Strategy*. Online at <http://www.igospartners.org>
- IPCC (1992) *Climate Change 1992: the Supplementary Report to the IPCC Scientific Assessment*. J.T. Houghton, B.A. Callandar and S.K. Varney (eds.), Cambridge University Press, Cambridge.
- IPCC (1996) *Greenhouse Gas Inventory Reference Manual, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, vol. 3, J. T. Houghton, L. G. Meira Filho, B. Lim, K. Tréanton, I. Mamaty, Y. Bonduki, D. J. Griggs and B. A. Callander (eds). Intergovernmental Panel on Climate Change, United Nations Environment Programme, Organisation for Economic Cooperation and Development, 425 pp.
- Jeanjean, H. and Achard, F. (1997) A new approach for tropical forest area monitoring using multiple resolution data, *International Journal of Remote Sensing* **18**, 2455–2461.
- Johns, T. C., Carnell, R. E., Crosley, J. F., Gregory, J. M., Mitchell, J. F. B., Senior, V. A., Tett, S. F. B. and Wood, R. A. (1997) The second Hadley Centre coupled ocean-atmosphere GCM: spinup and validation. *Climate Dynamics* **13**, 103–134.
- Jones, P. D., New, M., Parker, D. E., Martin, S. and Rigor, I. G. (1999) Surface air temperature and its changes over the past 150 years. *Reviews of Geophysics and Space Physics* **37**, 173–199.
- Kaufman, Y. and Holben, B. N. (1993) Calibration of the AVHRR visible and near-IR bands by atmospheric scattering, ocean glint, and desert reflection. *International Journal of Remote Sensing* **14**, 21–52.
- Keeling, C. D. and Whorf, T. P. (1998) *Atmospheric Carbon Dioxide Record from Mauna Loa*. Online at <http://www.cdiac.esd.ornl.gov/trends/co2/sio-mlo.htm>
- Keeling, C. D., Backastow, R. B. and Whorf, T. P. (1982) Measurements of concentration of carbon dioxide at Mauna Loa Observatory, Hawaii. In: W. C. Clarke (ed.), *Carbon Dioxide Review*. Oxford, Oxford University Press, pp. 377–385.

- Khorram, S. (1982) Remote sensing of salinity in the San Francisco Bay delta. *Remote Sensing of Environment* **12**, 15–22.
- Kidder S. Q. and Von der Haar, T. H. (1995) *Satellite Meteorology*. Academic Press, San Diego, 466 pp.
- Kidwell, K. (1995) *NOAA Polar Orbiter Data Users Guide*. NOAA/NESDIS Climatic Data Center, Satellite Data Services Division, Washington, DC.
- Kondratyev, K. Ya. (1998) *Multidimensional Global Change*. Wiley, Chichester.
- Kondratyev, K. Ya. (1999) *Climatic Impact of Aerosols and Clouds*. Springer-Praxis, Chichester.
- Kondratyev, K. Ya. and Cracknell A.P. (1998) *Observing Global Climate Change*. Taylor and Francis, London.
- Kondratyev, K. Ya. and Donshenko, V. K. (1999) *Ecodynamics and Geopolicy. Volume 1. Global Problems*. SPB Science Centre Publications, St Petersburg [in Russian].
- Kondratyev, K. Ya. and Pokrovsky, O. M. (1977) Planning multipurpose experiments in remote sensing of the parameters of the environment and natural resources. *Izvestiya of USSR Academy of Sciences, Series Geography* **3**, 83–89.
- Kondratyev, K. Ya. and Pokrovsky, O. M. (1989) The International Geosphere-Biosphere Programme. Key aspects of requirements to Earth satellite observation data. *Izvestiya of USSR Academy of Sciences, Series Geography* **1**, 20–28.
- Kramer, H. J. (1996) *Observation of the Earth and its Environment – Survey of Missions and Sensors*. Springer, Heidelberg.
- Lawford, R. G. (1999) A midterm report on the GEWEX continental-scale international project (GCIP). *Journal of Geophysical Research-Atmospheres* **104**(D16), 19279–19292.
- Leakey, R. and Lewin, R. (1995) *The Sixth Extinction: Biodiversity and its survival*. Doubleday, New York.
- Lillesand, T. M. and Kiefer, R.W. (2000) *Remote Sensing and Image Interpretation*, 4th edn. Wiley, Chichester.
- Loeb, N. J. (1997) In-flight calibration of NOAA AVHRR visible and near-infrared bands over Greenland and Antarctica. *International Journal of Remote Sensing* **18**, 477–490.
- Lorenc, A. C., Bell, R. S. and Macpherson, B. (1991) The Meteorological Office analysis convection data assimilation scheme. *Quarterly Journal of the Royal Meteorological Society* **117**, 59–89.
- Loveland, T. R., Merchant, J. W., Ohlen, D. O. and Brown, J. F. (1991) Development of a land cover characteristics data base for the conterminous US. *Photogrammetric Engineering and Remote Sensing* **57**, 1453–1463.
- Loveland, T. R., Zhu, Z., Ohlen, D. O., Brown, J. F., Reed, B. C. and Yang, L. (1999) An analysis of the IGBP global land cover characterization process. *Photogrammetric Engineering and Remote Sensing* **65**, 1021–1032.
- Machenauer, B. (1977) On the dynamics of gravity oscillations in a shallow water model with application to normal mode initialization, *Contributions to Atmospheric Physics* **50**, 253–271.
- Mantripp, D. (1994) *Radar Altimetry*. In: *The Determination of Geophysical Parameters from Space*. Institute of Physics, Bristol.
- Martonchik, J. V., Diner, D. J., Pinty, B., Verstraete, M. M., Nyneni, R. B., Knyazikhin, Y. and Gordon, H. R. (1998) Determination of land and ocean reflective, radiative and biophysical properties using multiangle imaging. *IEEE Transactions on Geoscience and Remote Sensing* **36**, 1266–1281.
- Mathews, E. (1983) Global vegetation and land use: new high resolution data bases for climate studies, *Journal of Climate and Applied Meteorology* **22**, 474–487.

- Matson, M. and Dozier, J. (1981) Identification of subresolution high temperature sources using a thermal IR sensor. *Photogrammetric Engineering and Remote Sensing* **47**, 1311–1318.
- Menaut, J. C. (1983) The vegetation of African Savannas. In: F. Bourlière (ed.), *Ecosystems of the World. 13. Tropical Savannas*. Elsevier Scientific, Amsterdam, pp. 109–149.
- Miller, K. and Barber, C. (1992) Biodiversity after Earth Summit: prospects for the Convention on Biodiversity. *Network '92*, No. 18, p. 5.
- Mitchell, R. M., O'Brien, D. M. and Forgan, B. W. (1992) Calibration of the NOAA AVHRR shortwave channels using split-pass imagery: 1. Pilot study. *Remote Sensing of Environment* **40**, 57–65.
- Morcrette, J. J. (1989) Description of the radiation scheme in the ECMWF model. *Technical Memorandum*, 165. ECMWF, Reading.
- Morcrette, J. J. (1991) Radiation and cloud radiative properties in the European Centre for Medium Range Weather Forecasting System. *Journal of Geophysical Research* **96**, 9121–9132.
- Muirhead, K. and Cracknell, A. P. (1984) Identification of gas flares in the North Sea using satellite data. *International Journal of Remote Sensing*, **6**, 827–833.
- Myneni, R. B., Keling, C. D., Tucker, C. J., Asrar, G. and Nemani, R. (1997) Increased plant growth in the northern high latitudes from 1981–1991. *Nature* **386**, 698–701.
- NASA/NOAA (1989) Memorandum of Understanding between the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration for Earth Observation Remotely Sensed Data Processing, Archiving, and Related Science Support (also Addendum dated 1990). NASA, Washington, DC.
- National Research Council (2000) *Reconciling Observations of Global Temperature Change*. National Academy Press, Washington, DC.
- Neckel, H. and Labs, D. (1984) The solar radiation between 3300 and 12500 Å. *Solar Physics* **90**, 205–208 (addenda to this work, and contributions of various groups to the extension to longer wavelengths have also been used).
- Nguyen, L., Minnis, P., Kirk Ayers, J., Smith, Jr W. L. and Shu Peng Ho (1999) Intercalibration of geostationary and polar imager data using AVHRR, VIRS, and ATSR-2 data. Preprint volume, *10th Conference on Atmospheric Radiation, Madison, Wisconsin*. American Meteorological Society, pp. 405–408.
- Nobre, C. A., Sellers, P. J. and Snukla, J. (1991) Amazonian deforestation and regional climate change. *Journal of Climate, American Meteorological Society* **4**, 957–988.
- Noilham, J. and Planton, S. (1989) A simple parametrization of land surface processes for meteorological models. *Monthly Weather Reviews* **117**, 536–549.
- Nuttall, N. (1999) Oceans to rise 20ft if ice sheet melts. *The Times (London)*, 18 October 1999.
- Olson, J. S., Watts, J. A. and Allison, L. J. (1985) *Major World Ecosystems Ranked by Carbon in Live Vegetation: A Database*, NDP-017. Carbon Dioxide Information Center, Oak Ridge National Laboratory, Oak Ridge, TN.
- Parrish, D. and Cohn, S. (1985) *A Kalman Filter for a Two-dimensional Shallow-water Model: Formulation and Preliminary Experiments*, National Meteorological Center Office Note 34. US Department of Commerce, NOAA, National Weather Service, Washington, DC.
- Pearson, E. S. and Hartley, H. O. (eds) (1966) *Biometrika Tables for Statisticians*, vol. 1, 3rd edn. Cambridge University Press, Cambridge (see table 41 and p. 84).
- Pinnock, S. and Grégoire, J.-M. (1999) *The World Fire Web, Global Vegetation Monitoring Unit*. Online at <http://www.gvm.sai.jrc.it>

- Pokrovsky, O. M. (1981) *Problems of the Optimisation of Remote Sensing Systems for Determining the Parameters of the Atmosphere, Ocean and Natural Environment*. VINITI, Russian Institute of Scientific and Technical Information, Moscow.
- Posmentier, E. S., Soon, W. H. and Baliunas, S. L. (1998) Relative impacts of solar irradiance variations and greenhouse changes on climate, 1880–1993. In: R. Bate (ed.), *Global Warming – the Continuing Debate*. The European Science and Environment Forum, London, pp. 159–172.
- Rabier, F., Courtier, P., Pailleux, J. Talagrand, O. and Vasiljevic, D. (1993) A comparison between four-dimensional variational assimilation relying on three-dimensional variational analyses. *Quarterly Journal of the Royal Meteorological Society* **119**, 845–880.
- Rao, C. R. N. (1987) *Pre-launch Calibration of Channels 1 and 2 of the Advanced Very High Resolution Radiometer*, NOAA Technical Report NESDIS 36. Department of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service.
- Rao, C. R. N. and Chen, J. (1993) Calibration of the visible and near-infrared channels of the Advanced Very High Resolution Radiometer (AVHRR) after launch. In: P. S. Chavez and R. A. Schowengerdt (eds), *Proceedings of SPIE Conference on Recent Advances in Sensors, Radiometric Calibration, and Processing of Remotely Sensed Data*. SPIE, Bellingham, Washington, DC, pp. 56–66.
- Rao, C. R. N. and Chen, J. (1995) Inter-satellite calibration for the visible and near-infrared channels of the Advanced Very High Resolution Radiometer on the NOAA-7, -9, and -11 spacecraft. *International Journal of Remote Sensing* **16**, 1931–1942.
- Rao, C. R. N., and Chen, J. (1999) Revised post-launch calibration of the visible and near-infrared channels of the Advanced Very High Resolution Radiometer (AVHRR) on the NOAA-14 spacecraft. *International Journal of Remote Sensing* **20**, 3485–3491.
- Rao, C. R. N., Chen, J. Staylor, F.W. Abel, P. Kaufman, Y.J. Vermote, E. Rossow, W.R. and C. Brest (1993a) *Non-linearity Corrections for the Thermal Infrared Channels of the Advanced Very High Resolution Radiometer: Assessment and Recommendations*, NOAA Technical Report NESDIS 69. Department of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service.
- Rao, C. R. N., Chen, J. Staylor, F.W. Abel, P. Kaufman, Y.J. Vermote, E. Rossow, W.R. and C. Brest (1993b) *Degradation of the Visible and Near-Infrared Channels of the Advanced Very High Resolution Radiometer on the NOAA-9 Spacecraft: Assessment and Recommendations for Corrections*, NOAA Technical Report NESDIS 70. Department of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, Washington, DC.
- Rao, C. R. N., Stowe, L. L. and McClain, E. P. (1989) Remote sensing of aerosols over the oceans using AVHRR data: theory, practice and applications. *International Journal of Remote Sensing* **10**, 743–749.
- Rees, W. G. (1999) *The Remote Sensing Data Book*. The University Press, Cambridge.
- Reynolds, R. W. and Smith, T. M. (1994) Improved global sea surface temperature analyses. *J. Climate* **7**, 929–948.
- Richards, T. S., Gallego, J. and Achard, F. (2000) Sampling for forest cover change assessment at the Pan-Tropical Scale. *International Journal of Remote Sensing* **21**, 1473–1490.
- Robinson, J. W., Gunther, F. J. and Campbell, W. J. (1983) *Ground Truth Sampling and LANDSAT Accuracy Assessment*, document N83-26161. National Technical Information Services.

- Rosenfeld, G. H. (1986) Analysis of thematic map classification error matrices. *Photogrammetric Engineering and Remote Sensing* **52**, 681–686.
- Rosenfeld, G. H. and Fitzpatrick-Lins, K. (1986) A coefficient of agreement as a measure of thematic classification accuracy. *Photogrammetric Engineering and Remote Sensing* **52**, 223–227.
- Rosenfeld, G. H., Fitzpatrick-Lins, K. and Ling, H.S. (1982) Sampling for thematic map accuracy testing. *Photogrammetric Engineering and Remote Sensing* **48**, 131–137.
- Rosenqvist, A., Taylor, V., Chapman, B., Shimada, M., Freeman, A., De Grandi, G., Saatchi, S. and Rauste, Y. (2000) The Global Rain Forest Mapping Project – A review. *International Journal of Remote Sensing* **21**, 1375–1387.
- Rouse, J. W. Jr, Haas, R. H., Schell, J. A., Deering, D. W. and Harlan, J.C. (1974) *Monitoring the Vernal Advancement and Retrogradation (Green Wave Effect) of Natural Vegetation*, NASA type III, Final report, RSC 1978–4. Greenbelt, MD, Goddard Space Flight Center.
- Running, S. W., Justice, C. O., Salomonson, V., Hall, D., Barker, J., Kaufmann, Y. J., Strahler, A. H., Huete, A. R., Muller, J.-P., Vanderbilt, V., Wan, Z. M., Teillet, P. and Carneggie, D. (1994a) Terrestrial remote sensing science and algorithms planned for EOS/MODIS. *International Journal of Remote Sensing* **15**, 3587–3602.
- Running, S. W., Loveland, T. R. and Pierce, L. L. (1994b) A vegetation classification logic based on remote sensing for use in global biogeochemical models. *Ambio* **23**, 77–81.
- Salati, E. (1987) The forest and the hydrological cycle. In: R. E. Dickinson (ed.), *The Geophysiology of Amazonia: Vegetation and climate interactions*. J. Wiley & Sons, New York, pp. 273–296.
- Scepan, J. (1999) Thematic validation of high resolution global land cover data sets. *Photogrammetric Engineering and Remote Sensing* **65**, 1051–1060.
- Schiffer, R. A. and Rossow, W. B. (1983) The International Satellite Cloud Climatology Project: the first project of the World Climate Research Programme. *Bulletin of the American Meteorological Society* **64**, 779–784.
- Segalstad, T. V. (1996) In: J. Emsley (ed.), *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 41–50.
- Singer, S. F. (1996) A preliminary critique of IPCC's Second Assessment of Climate Change. In: J. Emsley (ed.), *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 146–157.
- Slater, P. (1997) Sensor requirements for the radiometric consistency of long-term, global, land data sets. In: B. Guerther, J. Butler and P. Ardanuy (eds), *Workshop on Strategies for Calibration and Validation of Global Change Measurements, Arlington, VA, 10–12 May 1995*, NASA Reference Publication 1397. NASA, Washington, DC, pp. 69–72.
- Slater, P. N., Biggar, S.F. Thome, K.J. Gilman, D.L. and Spyak, P.R. (1996) Vicarious calibration of EOS sensors. *Journal of Atmospheric and Oceanic Technology*. **13**, 343–359.
- Smith, G. R., Levin, R.H. Abel, P. and Jacobowitz, H. (1988) Calibration of the solar channels of NOAA-9 AVHRR using high altitude aircraft measurements. *Journal of Atmospheric and Oceanic Technology* **5**, 631–639.
- Soon, W., Baliunas, S. L., Robinson, A. B., Robinson Z. W. and Idso, S. B. (1999) *Environmental Effects of Increased Atmospheric Carbon Dioxide*, publication number 4809. Smithsonian Centre for Astrophysics, Harvard.
- Staylor, W. F. (1990) Degradation rates of the AVHRR visible channel for the NOAA-6, -7, and -9 spacecraft. *Journal of Atmospheric and Oceanic Technology* **7**, 411–423.
- Stehman, S. V. (1996) Estimating the kappa coefficient and its variance under stratified random sampling. *Photogrammetric Engineering and Remote Sensing* **62**, 401–407.

- Steyn-Ross, D.A. and Steyn-Ross, M. (1992) Radiance calibrations for advanced very high resolution radiometer infrared channels. *Journal of Geophysical Research* **97**, 5551–5568.
- Strong, A., Barrientos, C., Duda, C. and Sapper, J. (1997) Improved satellite techniques for monitoring coral bleaching. In: H. A. Lessios and I. G. Macintyre (eds), *Proceedings of 8th International Coral Reef Symposium, Panamá, 24–26 June 1996*. Smithsonian Tropical Research Institute, Balboa, Panamá, pp. 1495–1498.
- Stroppiana, D., Pinnock, S. and Grégoire, J. M. (2000) The Global Fire Product: daily fire occurrence from April 1992 to December 1993, derived from NOAA-AVHRR data. *International Journal of Remote Sensing* **21**, 1279–1288.
- Sullivan, W. T., Werthimer, D., Bowyer, S., Cobb, J., Gedye, D. and Anderson, D. (1997) A new Major SETI project based on Project SERENDIP data and 100,000 personal computers, In: C. B. Cosmorovici, S. Bowyer and D. Werthimer (eds), *Astronomical and Biochemical Origins and the Search for Life in the Universe (Proceedings of the Fifth International Conference on Bioastronomy, Capri, 1–5 July 1996)*, IAU Colloquium No. 161. Editrice Compositori, Bologna, pp. 729–734.
- Tahnk, W. R. and Coakley, J. A. (2001) Improved calibration coefficients for NOAA-14 AVHRR visible and near-IR channels. *International Journal of Remote Sensing* **22**, 1269–1283.
- Talagrand, O. and Courtier, P. (1987) Variational assimilation of meteorological observations with the adjoint vorticity equations. Part 1. Theory. *Quarterly Journal of the Royal Meteorological Society* **113**, 1311–1328.
- Tarantola, A. (1987) *Inverse Problem Theory*. Elsevier, Amsterdam.
- Teillet, P. M., Slater, P. N., Ding, Y., Santer, R. P., Jackson, R. D. and Moran, M. S. (1990) Three methods for the absolute calibration of the NOAA sensors in-flight. *Remote Sensing of Environment* **31**, 105–120.
- Tickell, C. (1977) *Climatic Change and World Affairs*. Center for International Affairs, Harvard.
- Tolba, M. K. and El-Kholy, O. A. (1992) *The World Environment 1972–1992*. Chapman and Hall, London.
- Townshend, J. R. G. (ed.) (1992) *Improved Global Data for Land Applications*, IGBP report number 20. IGBP Secretariat, Royal Swedish Academy of Sciences, Stockholm, Sweden, 87 pp.
- Townshend, J. R. G. and Williams, D. (1998) *The Concept of an Integrated Global Observing Strategy*. Online at: <http://www.igospartners.org>
- Townshend, J. R. G., Justice, C. O., Skole, D., Malingreau, J.-P., Cihlar, J., Teillet, P. M., Sadowski, F. and Ruttenberg, S. (1994) The 1-km AVHRR global data set: needs of the International Geosphere Biosphere Program. *International Journal of Remote Sensing* **15**, 3319–3332.
- Trenberth, K. E. (1992) *Climate System Modeling*. Cambridge University Press, Cambridge.
- Tucker, C. J. and Sellers, P. J. (1986) Satellite remote sensing of primary production. *International Journal of Remote Sensing* **7**, 1395–1416.
- Tyndall, J. (1863) On radiation through the Earth's atmosphere. *Philosophical Magazine and Journal of Science, Series 4*, **25**, 200–206.
- Ulbrich, U. and Christophe, M. (1999) A shift of the NAO and increasing storm track activity over Europe due to anthropogenic greenhouse gas forcing. *Climate Dynamics* **15**, 551–559.
- UNEP (1999) *Earthwatch Strategic Framework for Environmental Observing, Assessment and Reporting*, UN System-Wide Earthwatch Coordination document. UN System-wide

- Earthwatch United Nations Environment Programme, Geneva, Switzerland. Online at: <http://www.unep.ch/earthw.html>
- UNFCCC (1992) *United Nations Framework Convention on Climate Change*, adopted in New York on 9th May 1992. United Nations Climate Change Secretariat, Bonn. Online at: <http://www.unfccc.de/>
- UNFCCC, (1997) *The Kyoto Protocol to the United Nations Framework Convention on Climate Change (Addendum)*, FCCC/CP/1997/L7/Add. 1, December 10. United Nations, New York.
- Unniner, S. and Schiffer, R. A. (1997) *In-situ Observations for the global Observing Systems: A Compendium of Requirements and Systems*, NP-1997(01)-002-GSFC. NASA Office of Mission to Planet Earth, Greenbelt, MD, 286 pp.
- Vaughan, R. A. (1994) Remote sensing, systems and data. In: R. A. Vaughan and A. P. Cracknell (eds), *Remote Sensing and Global Climate Change*. Springer, Heidelberg.
- Vaughan, R. A. (1998) The role of remote sensing in climate monitoring. In: R. Bate (ed.), *Global Warming – the Continuing Debate*. The European Science and Environment Forum, Cambridge.
- Vaughan, R. A. and Cracknell, A. P. (eds) (1994) *Remote Sensing and Global Climate Change*. Springer, Berlin.
- Vaughan, R. A. and Karamjavan, Z. (2000) Topographic mapping using Topex satellite imagery. *Journal of Surveying Engineering* **126**(3), 106–122.
- Vermote, E. and Kaufman, Y. J. (1995) Absolute calibration of AVHRR visible and near-infrared channels using ocean and cloud views. *International Journal of Remote Sensing* **16**, 2317–2340.
- Verstraete, M. M. and Dickinson, R. E. (1986) Modeling surface processes in atmospheric general circulation models. *Annales Geophysicae* **4**, 357–364.
- Verstraete, M. M. and Pinty, B. (1996) Designing optimal spectral indices for remote sensing applications. *IEEE Transactions on Geoscience and Remote Sensing* **34**, 1254–1265.
- Walton, C. C., Sullivan, J. T., Rao, C. R. N. and Weinreb, M. P. (1998) Corrections for detector nonlinearities and calibration inconsistencies of the infrared channels of the advanced very high resolution radiometer. *Journal of Geophysical Research* **103**, 3323–3337.
- Warrick, R. A., Le Provost, C., Meier, M. F., Oerlemans, J. and Woodworth, P. L. (1996) Changes in sea level. In: J. T. Houghton, L. G. Meira Filho, B. A. Callandar, N. Harris, A. Kattenberg and K. Maskell (eds), *Climate Change 1995: The Science of Climate Change*. Cambridge University Press, Cambridge, pp. 364–405.
- Washington, W. M. and Parkinson, C. L. (1986) *An Introduction to Three Dimensional Climate Modelling*. University Science Books, Mill Valley.
- Weber, G. (1996) European temperature variations since 1525. In: J. Emsley (ed.), *The Global Warming Debate*. The European Science and Environment Forum, London, pp. 113–138.
- Weinreb, M. P., Hamilton, G. Brown, S. and Koczor, R. J. (1990) Nonlinearity corrections in the calibration of the Advanced Very High Resolution Radiometer infrared channels. *Journal of Geophysical Research* **95**, 7381–7388.
- Werthimer, D., Bowyer, S., Ng, D., Donnelly, C., Cobb, J., Lampton, M. and Airieau, S. (1997) The Berkeley SETI Program: SERENDIP IV Instrumentation. In: C. B. Cosmovici, S. Bowyer and D. Werthimer (eds), *Astronomical and Biochemical Origins and the search for Life in the Universe (Proceedings of the Fifth International Conference on Bioastronomy, Capri, 1–5 July 1996)*, IAU Colloquium No. 161. Editrice Compositori, Bologna, pp. 683–688.

- WGBU (1998) *The Accounting of Biological Sinks and Sources under the Kyoto Protocol: A Step Forwards or Backwards for Global Environmental Protection?* German Advisory Council on Global Change special report. Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen, Bremerhaven, 75 pp. Online at: http://www.wbgu.de/wbgu_sn1998_engl.html
- Whitlock, C. H., Staylor, W. F., Suttles, J. T., Smith, G., Levin, R., Frouin, R., Gautier, C., Teillet, P. M., Slater, P. N., Kaufman, Y. J., Holben, B. N., Rossow, W. B., Brest, C. and Lecroy, S. R. (1990) AVHRR and VISSR satellite instrument calibration results both for cirrus and marine stratocumulus IFO periods, FIRE Science Results 1988, NASA Conference Proceedings CP 3083.
- Wigley, T. M. L. and Raper, S. C. B. (1992) Implications for climate and sea level of revised IPCC emissions scenarios. *Nature* **357**, 293–300.
- World Commission on Environment and Development (WCED) (1987) *Our Common Future*. Oxford University Press, Oxford.
- Wu, A. and Zhang, Q. (1994) A method for determining the sensor degradation rates of the NOAA AVHRR channels 1 and 2. *Journal of Applied Meteorology* **33**, 118–122.
- Zupanski, D. (1997) A general weak constraint applicable to operational 4DVAR data assimilation systems. *Monthly Weather Review* **125**, 2274–2292.