World Meteorological Organization

Second JCOMM Workshop on Advances in Marine Climatology (CLIMAR-II)

By D. Parker[1], E. Kent[2], S. Woodruff[3], D. Dehenauw[4], D.E. Harrison[5], T. Manabe[6], M. Mietus[7], V. Swail[8], S. Worley[9]

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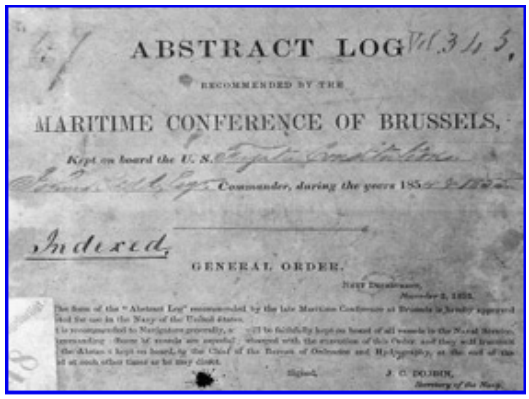
Background

The Second Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) Workshop on Advances in Marine Climatology (CLIMAR-II) was held in Brussels, Belgium, on 17-22 November 2003 with more than 80 people from 20 WMO Member countries attending. CLIMAR-II was organized jointly by JCOMM and the Royal Meteorological Institute of Belgium, and sponsored by the Belgian Federal Science Policy Office, Environment Canada, the Japan Meteorological Agency and the US National Oceanic and Atmospheric Administration.


ABSTRACT LOG

RECOMMENDED BY THE

MARITIME CONFERENCE OF BRUSSELS,

Kept on board the U. S.

Commander, during the years 185

Indexed,

GENERAL ORDER.

Figure 1 — Abstract log of the US Frigate Constitution, 1854-1855 (Naval Observatory Volume No. 345; Deutscher Wetterdienst Registration No. 8148 (reprinted from Braun, 2000))

Proceedings

CLIMAR-II was divided into three main sessions on cross-cutting issues; sea-level pressure (SLP), wind and waves; and marine temperatures and sea ice. Estimation of uncertainty was a common theme in all the sessions. Many of the presentations were based on the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) (initially named I-COADS but now renamed as ICOADS to ease citation and Web paging). ICOADS incorporates the Met Office's Marine Data Bank and millions of newly digitized logbook records, with careful elimination of duplicates (Diaz et al., 2002).

Comparison with the recommendations of the Workshop on Advances in the Use of Historical Marine Climate Data (Boulder, USA, January/February 2002) (Diaz et al., 2002) revealed that good progress had been made in many areas: data coverage; understanding and reducing biases; specification of uncertainties; quality-control (QC) techniques; availability of additional land-station sea-level pressure (SLP) data; and development of techniques for reanalysis of atmospheric circulation in the pre-radiosonde era.

Other areas where some progress had been achieved were: the approval by the WMO Executive Council of a format for metadata from Ocean Data Acquisition Systems (ODAS) including buoys; analysis of diurnal cycles in sea-surface temperatures (SST) using geostationary satellite data; availability of satellite-based temperatures for inland seas and large lakes; research to improve the specification of SST in marginal ice zones; assembly of the first version of a blended sea-ice dataset for the Arctic for 1950-1998 by the JCOMM Expert Team on Sea Ice; improvement of cloud-clearing techniques for satellite-based SST; and assessment of biases in the Maury SLP data.

There had also been a substantial international effort to prepare recommendations for enhancements to GCOS (GCOS, 2003).

Much, however, remains to be done: millions of marine observations remain to be located and digi-

1 Met Office, United Kingdom
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4 Royal Meteorological Institute of Belgium
5 NOAA Pacific Marine Environmental Laboratory, USA
6 WMO Secretariat
7 Institute of Meteorology and Water Management, Poland
8 Environment Canada
9 National Center for Atmospheric Research, USA

Figure 2 (from left to right) — US steam frigate Mississippi, in the Gulf of Mexico, March 1847 (Library of Congress, Prints & Photographs Division [reproduction number LC-USZC2-3129] (originally published by N. Currier, New York, 1848)); *Florida peninsula, January 1985* (NASA Space Shuttle Earth Observations Photography database [photo STS51C-44-0026]); *Tropical Ocean Atmosphere (TAO) buoy and anemometers on NOAA ship Ka'Imimoana* (Photo by Jason Poe, courtesy of TAO Project Office)

tized from logbooks (e.g. Figure 1), and millions that are already digitized remain to be blended into ICOADS; the biases in marine temperatures around 1939-1945 are still poorly understood. Daytime marine air temperature (MAT) data need to be made useable (application of the GCOS Climate Monitoring Principles (Appendix 2 of GCOS, 2003)); assessments of uncertainties and assessment techniques need to be improved; target accuracies need to be identified; large areas at and below the ocean surface remain unobserved. All these recommendations are applications of the GCOS Climate Monitoring Principles (Appendix 2 of GCOS, 2003).

Certain Boulder recommendations, such as creation of sub-monthly analyses of SST and sea ice, and adjustment of historical wind-speed data, are still at an early stage. CLIMAR-II supported the need for sub-monthly (pentad) analyses. Pentad SST analyses based on satellite data (e.g. Reynolds et al., 2002) are valuable but require in situ data for validation and often for calibration also. Adjustment of historical wind speeds is particularly difficult without metadata. Some useful work has been done for the post-World War II period (e.g. Ward and Hoskins, 1996), which showed that the problems in the raw data are indeed serious, but this needs extending throughout the ICOADS period. QC techniques for all parameters need to be fully and consistently documented; if possible, QC methods used throughout ICOADS should be homogeneous.

There were seen to be shortcomings in the access to ICOADS data. There are many, overlapping sources of data and products, and the problem of optimising data provision is complex. Many users are working with outdated versions of COADS. Often data are available, but it is difficult for the uninitiated to discover what is there. There should be a Web-based "route map" to the best available data which should be widely advertised to all the various user communities.

Recommendations by CLIMAR-II

Various recommendations were made in the areas of climate monitoring, metadata, homogenization and data availability. Ideally, all the recommendations (except that for holding CLIMAR-III) should be implemented within two years. The consolidated Boulder and CLIMAR-II recommendations are available at http://www.cdc.noaa.gov/coads/climar2/recs.html. The need to improve GCOS, and to adhere to the GCOS Climate Monitoring Principles is implicit, bearing in mind that any distinction between "operational" and "climate" observations is artificial. The recommendations should be implemented in collaboration with the various GCOS Panels and/or JCOMM.

Conclusions

Presentations made at CLIMAR-II will be incorporated into a JCOMM Technical Report (JCOMM, 2004) and a selection of papers will be published in a special issue of the International Journal of Climatology, which will form an update of the Dynamic Part of the WMO Guide to the Applications of Marine Climatology (WMO-No. 781). CLIMAR-II will thus provide guidance and technical support to National Meteorological Services in their acquisition, processing, analysis and application of marine meteorological data.

Acknowledgements

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