



The Global Geophysical Fluid Center Special Bureau for Loading: Status and validation of products for conventional treatment of air pressure loading

H.-P. Plag (1), H. P. Kierulf (2), T. van Dam (3)

(1) Nevada Bureau of Mines and Geology and Seismological Laboratory, University of Nevada, Reno, Nevada, USA; (2) Norwegian Mapping Authority, Norway; (3) European Center for Geodynamics and Seismology, Luxembourg (hpplag@unr.edu)

Since February 2002, the Special Bureau for Loading (SBL) has been working towards providing operational products related to surface loading, which eventually can be used to account for the loading signals in the determination and monitoring of the terrestrial reference frame and the determination of station coordinates. Initially, our main focus has been on products related to atmospheric loading. Currently, the SBL provides a set of time series for all ITRF sites and selected other global and regional networks as well as global grids of predictions of the 3-d surface displacements mostly spanning the interval from 1990 to 2004. These products are mainly for research purposes. The station time series are available for a number of different surface pressure data sets, computational approaches and earth models. Moreover, in the frame of a validation project, global grids of loading induced 3-d displacements with a temporal resolution of 6 hours are rapidly provided (with a latency of currently 10 hours). Likewise, time series for all ITRF stations and other regional and global networks are updated with the same latency. For each of the networks, six-hourly samples of the network station displacements due atmospheric loading are also provided. All the low-latency products are based on the air pressure data made available by the ECMWF.

The SBL is conducting research in order to improve the quality of the products and to make progress towards a conventional model for the air pressure loading effect. In particular, we have addressed the differences due to (1) the air pressure data set used, (2) the effect of surface topography including the seasonal variation in the temperature profile and its effect on the surface pressure anomaly, (3) the choice of the reference

surface for air pressure, and (4) the ocean's response to air pressure forcing. A detailed, global validation study has been carried out in order to assess the quality of the different products. This validation makes use of the global network of GPS reference stations maintained in the frame of the IGS. Similar research is conducted with respect to modeling the loading due to continental water storage and non-tidal ocean loading. Research products related to these loading contributions are being made available for the same set of stations as for air pressure loading.

The SBL also provides educational material required for the proper use of the products, particularly in the frame of the IERS Conventions.