3.5.6.7 Special Bureau for Loading

In 2005, the Special Bureau for Loading (SBL) began making available near-real time predictions of the surface displacements due to atmospheric loading. The predictions are provided as global grids, time series for the ITRF sites and other selected global and regional networks, and as files comprising the point displacements for the different networks for a given epoch. All products are given for a sampling interval of 6 hours and are updated with a latency of currently 10 hours. The global grids are provided with a spatial resolution of 2.5 degrees. The air pressure anomalies are derived from the operational European Center for Medium Range Weather (ECMWF) Forecast sea-level pressure. The pressure anomalies are computed for the Earth's surface using the ETOP5 surface topography and the ECMWF temperature data to propagate sea level pressure to the Earth's surface. The air pressure reference surface is computed as the average of the surface pressure over 10 years. The solar tides S1 and S2 are not removed from the predictions. The displacement predictions are provided for a validation step involving the Analysis Centres of the IAG services as well as the SBL itself. After that validation step, the use of the products in monitoring the reference frame or in providing corrections for geodetic analysis will be possible.

The SBL has also updated the time series of predicted displacements to included results through the end of 2004. These time series, which are mainly provided for research purposes, represent the predicted 3-D deformation for all ITRF sites as well as a number of selected global and regional networks (e.g. IGS, SLR, VLBI, EUREF, etc.). Time series are available for the NCEP and ECMWF pressure data sets and calculations are done by different investigators using different earth models, different computational algorithms, and different reference frames. All available data sets are fully documented on the web site. The geodetic community has been comparing these data sets and the discrepancies found, besides those due to differences in the reference frame, are found to be mostly on the sub-millimeter level. However, a remaining uncertainty in the prediction is still due to the inverted barometer assumption, which is applied to the air pressure anomaly field for both the near-real time products and the station time series.

Members of the SBL have been conducting research to assess and improve the quality of the products provided by the SBL. Validation has been based largely on inter-comparison of the displacements computed by different authors and the comparison with the displacements observed by the IGS global GPS Network. For the improvement of the products, we have addressed the issue of the air pressure data set used, the effect of surface topography,

the choice of a reference surface, and the ocean's response to air pressure forcing [Haakonsen et al., 2004, Plag, 2004, Haakonsen et al. 2005].

Finally, we have successfully established a mirror site for the SBL at <http://www.ecgs.lu>.

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Tonie van Dam, Hans-Peter Plag, Halfdan P. Kierulf