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The IERS Conventions (2010)

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The principal products of the International Earth Rotation and Reference Systems Service (IERS) are the international celestial and terrestrial reference frames, ICRF and ITRF, and the set of Earth orientation parameters required to transform between them. These products are generated using several independent techniques therefore their quality strongly depends on using a consistent and complete set of models and procedures, which are formalized in the IERS Conventions. The IERS Conventions (2010) (Petit and Luzum, 2011) is the new reference edition replacing the Conventions (2003) (McCarthy and Petit, 2004). This document is the result of continuous work involving the collaboration of tens of scientists, with progress reflected in an electronic version at http://tai.bipm.org/iers/convupdt/convupdt.html. The paper presents the main features of the new reference edition, highlighting the most important changes with respect to the Conventions (2003). In this respect, the Conventions (2010)

• define classes of models and specify guidelines to choose which models should be applied for IERS core products;
• implement the latest recommendations of scientific unions and the conclusions of the unions' working groups and commissions;
• describe the latest realizations of the celestial and terrestrial reference frames and an updated model for the transformation between them;
• describe updated conventional models for the gravitational field and for the effect of ocean tides;
• complement the models for the displacement of reference points with new models for atmospheric tidal loading and for the oceanic pole tide loading;
• describe updated or new conventional models for signal propagation in the troposphere and ionosphere.

In addition, the Conventions now provide a complete set of associated conventional software, using a standard template that provides better readability of the code and more extensive commenting and including a test case for each routine.

The Conventions will continue to evolve with the progress in the field and we discuss some possible directions for evolution.

McCarthy, D.D., Petit, G. (eds.), 2004, "IERS Conventions (2003)," IERS Technical Note 32, Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 127 p.

Petit, G., Luzum, B.J., (eds.), 2011, "IERS Conventions (2010)," IERS Technical Note 36, Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, in print. See also http://tai.bipm.org/iers/conv2010 or http://maia.usno.navy.mil/conv2010.