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Stability of the long period terms in the La2011 astronomical solution.

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The obtention of an accurate astronomical solution for the orbital motion of the Earth in the Solar System is an essential step for the elaboration of geological time scales that are based on the correlation of sedimentary cycles with insolation variations on the Earth's surface. The widely used La2004 (Laskar et al, 2004) solution has a time validity of about 40 Myr. Since, a large effort has been undertaken in order to improve this solution and to extend its time of validity to 50 Myr (Laskar et al, 2011a). On the other hand, it was demonstrated that asteroid close encounters set an absolute limit for the possibility of precise prediction of the Earth's orbit to about 60 Myr (Laskar et al, 2011b).

In this context, we will report the latest development of the orbital solutions La2011 which present a noticeable improvement with respect to La2010. We will specially focus on the stability of the long period terms of 2.4 Myr in eccentricity and 1.2 Myr in obliquity.

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