



ID de Contribution: 50

Type: **Oral presentation**

Long-term variations in the Earth's orbit govern its insolation and climate

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These astronomical signals, which have been recovered in geological records, revolutionized the accuracy and precision of the geological timescale (Gradstein & Ogg 2020). However, the orbital variations beyond 60 Myr cannot be reliably predicted because of the chaotic dynamics of the Solar System planets (Laskar 1989). Taking into account the uncertainty of the orbital evolution beyond 60 Myr is thus necessary for astronomical calibration of geological records. Our work addresses this problem with a statistical analysis over 120 000 orbits of the secular model of the Solar System ranging from 500 Myr to 5 Gyr. We obtain the probability density function of the fundamental frequencies of the orbital motion by kernel density estimation and the corresponding confidence interval by moving block bootstrap. The results obtained with the secular model are shown to be compatible with direct integrations of a comprehensive model of the Solar System. Application of our work is illustrated on two geological data: Newark-Hartford records and Libsack core.

Field

Not in the above

Day constraints

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Classification de Session: Talk

Classification de thématique: Astrophysics