

Tracking astronomical cycles in palaeosoils, middle-Eocene, Spain

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Context

The Escanilla sediment routing system in the southern-Pyrenees, Spain is an extensively documented source-to-sink fluvial system corresponding to the Middle Eocene Climatic Optimum (MECO, ca. 40 Ma). 3 principal localities of this system have been identified, Coll de Vent, Lascurarre (focus of this project) and Olson, located at the proximal, intermediate, and distal part of the system. Interestingly, downstream from Lascurarre, at Olson, recent work [Sharma et al., 2021] has shown discharge variations in depositional sequences to be astronomically paced by the 400 kyr eccentricity cycles.

At Lascurarre, multiple bands of white and reddish palaeosoil color of varying thickness have been identified. The likelihood of astronomical cycles playing a role downstream makes it an interesting prospect to check for astronomical forcing upstream at Lascurarre.

Aims and Methods

Field work will entail stratigraphic logging, detailed description of palaeosoil appearance and obtaining soil color reflectance on the section of Lascurarre. This will further be correlated to geochemical data (isotopic analyses done on palaeosoils and carbonate nodules). Finally, the entire obtained dataset will be timescale correlated based on the existing magnetostratigraphic framework to detect the presence of astronomical cycles

References

Bentham, P. & Burbank, D. W. Tertiary basins of Spain. 144–152 (1996) doi :10.1017/cbo9780511524851.022
 Abels, H. A., M. J. Kraus, and P. D. Gingerich, 2013, Precession-scale cyclicity in the fluvial lower Eocene Willwood Formation of the Bighorn Basin, Wyoming (USA) : Sedimentology, v. 60, no. 6, p. 1467–1483, doi :10.1111/sed.12039.
 Hinnov, L. A. Cyclostratigraphy and its revolutionizing applications in the earth and planetary sciences. Gsa Bulletin 125, 1703–1734 (2013)



Website

<https://sites.google.com/view/earthsurfacedynamics>

Prerequisite

Students interested in this project would be advised (but not required) to choose “Geobiosphere, Climate and the Sedimentary Rock Records” as their main module