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Dating the West-Central Pyrenean deformation Front with magnetostratigraphy of its Oligo-Miocene syntectonic deposits

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Well-dated foreland basin deposits are crucial to correctly decipher the tectonic evolution of the orogen associated to the foreland basin. A magnetostratigraphic section of ca. 3.200 m in length has been done in the Northern margin of the Ebro foreland Basin, to the South of the frontal thrust (SFT). In this area, the frontal thrust produces the detachment of the Santo Domingo anticline, located in the External Sierras of the West-Central Pyrenees.
The main goal of our study is to constrain the age of the upper part of the syntectonic Campodarbe Fm. (Oligo-Miocene) which is at present under discussion and which represents an utterly change in the paleogeography of the depositional systems represented by the replacement of the Campodarbe Fm with the Uncastillo Fm (i.e. general change from overall W-NW-flowing to S-flowing paleocurrents), linked to the late tectonic activity of the SFT with the final tightening of the Santo Domingo anticlinal (Chattian-Aquitanian). Prior to this final tectonic activity and tightening of the anticlinal, overall fluvial paleocurrents (Campodarbe Fm.) were from the S-SE; in contrast, during and after such deformation period, overall southward-flowing alluvial systems occurred. Integration of our new data with previous magnetostratigraphic data of the Uncastillo Fm. and with the careful notation of the dip of layers provides information about the timing of thrusts development and allows reconstructing the kinematics of the Santo Domingo anticline at the western termination of the External Sierrras.
The new results indicate that the syn-tectonic deposits of the upper Campodarbe Fm. span over 6.5 Myr and that the upper part of the Campodarbe Fm. is younger than previously considered (reaching chron 7r, in contrast to previous correlations to C10r). On one hand, the new data constrain the cause of the cartographic scale unconformity within the Campodarbe Fm. and sets the time-span of the San Felices thrust sheet activity, part of the South Pyrenean Frontal thrust (SPFT), to $\sim$ 3 Myr. On the other hand, the new data ascertain precisely the age of the top of the Campodarbe Fm. and the change in paleogeography caused by the late tectonic activity of the SPFT with the final tightening of the Santo Domingo anticline (Chattian-Aquitanian). Finally, the isochrones within the Campodarbe Fm. need to be reconsidered in the light of the new results. Hopefully, this will seed new magnetostratigraphic studies in the area, to better constrain the chronology of the syntectonic deposits within the foreland and piggy-back basins.