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# Subsidence Analysis of the South-Pyrenean foreland basin from bio- and magnetostratigraphic sections

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Master research project

*“Reservoir geology and geophysics”*

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**Abstract.** A dynamic tectonic setting such as the South-Pyrenean foreland basin enables the characterization of the evolution of the subsidence in its entirety. Integration of already published stratigraphic and structural data from the Eocene sub-basins beside decompaction and backstripping techniques, leads us to understand how tectonic subsidence evolved. This approach is supported by the testing of different applications like the worldwide used petroleum system modeling PetroMod 2016 commercial software in addition to less known open source BasinVis or Microsoft Excel spread-sheets.

Our study reveals how regional isostatic flexure induced by the growing mountain chain affected the compartmentalisation of the South Pyrenean Central Unit (SPCU). The geometry of the southward progression of the Montsec thrust sheet during the Ypresian resulted into the sinking and subsequent incorporation of the Graus-Tremp sub-basin into a wedge-top system, which is observed in concave-up shaped geohistorical curves. This event conditioned the fast sinking of the western areas allowing deep marine turbiditic sedimentation in a foredeep setting. The following gradual emplacement of the Gavarnie thrust sheet alongside the growth of Mediano, Boltaña and Balzes anticlines resulted into the shifting of the subsiding zone towards Jaca sub-basin. The tectonic uplift signal of these local structures is barely seen in the burial curves because of the superimposition of the regional effect caused by big scale thrust sheets. Finally, due to the propagation of the Sierras Exteriores thrust sheet, northern Jaca area was integrated into the thrust-fold belt and the subsiding zone migrated towards the Ebro foreland basin.