

Internship available – Master 1 or 2 (Lyon & Paris)

Tracking vertical motions of sedimentary basins in external Albanides using InSAR and data-mining techniques.

Analyse des mouvements verticaux récents des bassins sédimentaires des Albanides externes par InSAR et fouille de données.

Context :

The large amount of radar images acquired over Albania since the launch of the Sentinel-1A mission in 2014 gave us the opportunity to capture significant on-going subsidence of the Myzeq plain located in the external Albanides (Fieri prefecture). The largest subsidence (~1.5 cm/yr) is observed over the Patos-Marinze heavy oil field (40.71°N, 19.61°E) that is intensely operated since 2004 with enhanced oil recovery techniques. Localized uplift (~5 mm/yr) recorded in the southern part of the field may be triggered by waste water injection in the shallow sedimentary layers. Simultaneously, cumulative seismic moment has significantly increased in the area since 2010, questioning the nature of this seismicity that could be man-induced. This local deformation associated with oil extraction overlays a larger scale subsidence motion that affects the entire sedimentary basin (~2 to 3 mm/yr) and which is probably associated with natural and anthropic compaction taking place in the sedimentary pile. Because untangling these distinct deformations from the InSAR time series is not trivial, their physical modeling and interpretation is getting more complicated.

Aims :

During this internship, we aim at (1) completing the InSAR time-series by processing more recent 2018-2019 images acquired over both the ascending and descending tracks, (2) use data-mining techniques developed by INSA-Lyon researchers to detect groups of pixels that share a similar temporal strain signature.

Tools :

The intern will use the NSBAS processing tool to calculate interferograms from Sentinel images and displacement time-series together with Raphaël Grandin (IPGP Paris) and Cécile Lasserre (LGLTPE) in order to gain a refined view of the basin straining. He/She will use the SITS-P2Miner data-mining software developed at INSA Lyon under the supervision of Catherine Pothier (<https://sites.google.com/view/sits-p2miner>).

Scientific team :

Marianne Métois (LGLTPE, Lyon), Raphaël Grandin (IPGP, Paris), Cécile Lasserre (LGLTPE, Lyon), Catherine Pothier (INSA Lyon, LIRIS)

Pay: for M2 intern 554€/month