

## **Internship available – L3 / M1 (Lyon)**

### **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 using data-mining techniques developed by INSA-Lyon researchers to detect groups of pixels that share a similar temporal strain signature. This novel approach will hopefully help untangling the different sources of deformation.

#### Tools :

The intern 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>) and the InSAR time-series previously obtained over the area using Sentinel-1 images. He/she will develop a small python code to conduct the calibration step needed to adapt SITS-P2MINER to the regional setting. He/She will use QGIS software for mapping.

#### Scientific team :

Cécile Lasserre (LGLTPE, Lyon), Catherine Pothier (INSA Lyon / LIRIS), Marianne Métois (LGLTPE, Lyon)