Field Experience, Marion Y. Thomas

SUMMARY

May 2014	Trenching along the Dead Sea transform fault to seek for paleoseismic record of earthquakes (2 weeks). *Organized by Y. Klinger.*
September 2012	Field work on the longitudinal Valley Fault (Taiwan), to map the Coastal Range and sample the Fault zone for microstructural analysis (3 weeks).
November 2011	Field trip in Baja California (Mexico) for the Ge136 course (4 days) as a teaching assistant. *Instructor: J. Kirschvink.*
May 2011	Grand Canyon field trip (Colorado) for the Ge1 course (3 days) as a teaching assitant. Instructor: B. Wernicke.
April 2010	Field work on the longitudinal Valley Fault (Taiwan) for field mapping and to collect samples for microstructural analysis (10 Days).
March 2010	3 days field trip in the Owen's Valley (California) for the Active Tectonic course (Ge177) as a teaching assistant. *Instructor: J.-P. Avouac.*
July/August 2007	Landslides hazard survey for the "Bureau de Recherche Geologique et Minière" (BRGM).
February 2007	Advanced field class in geophysics (seismic-refraction – GPS) in Finistère, France, (1 week). *Instructor: J. Perrot.*
September 2006	Field mapping in metamorphic area, Armorican Massif, France (1 week). *Instructors: J. Rolet, C. Sue.*
April 2006	Landslides survey in the valley of Ubaye (French Alps) for the master thesis (1 week).
February 2006	Marine geophysics training (seismic-reflection) (4 days). *Instructor: J.-P. Rehault.*
September 2005	Tectonics and sedimentary study of the coast of Britanny, France (1 week). *Instructors: M. Caroff, J. Rolet.*
May 2005	Stratigraphy and tectonics study of the French pre-Alps in Vesc area (10 days). *Instructors: P. Le Roy, M. Caroff.*
May 2005	Field mapping in igneous area, Massif Central, France (10 days). *Instructors: C. Hemon, R. Maury, M. Caroff, J.A. Barrat.*
March 2005	Field mapping in metamorphic area, Ouessant, France (5 days). *Instructors: M. Caroff, J.R. Darboux.*
September 2004	Advanced field class in geophysics (gravity, magnetic and electrical field) in Finistère, France, (3 days). *Instructors: P. Tarits, J. Perrot, C. Tisseau.*
May 2004	Stratigraphy and tectonic study of the Crozon's peninsula, France (5 days). *Instructors: A. Coutelle, J.-R. Darboux.*
2002-2007	Several one-day field trips to study metamorphic, igneous, and sedimentary rocks and structural geology.

May 2014: Under the lead of Yann Klinger I did two weeks of field work along the Levantine (or Dead Sea) transform fault. This field work involved field investigations and mostly trenching of the fault to seek for paleoseismic records of past earthquakes. We carefully mapped the sediments deposits, looked for evidences of past seismic ruptures and extracted charcoals for radiocarbon dating analysis.

September 2012: Field work on the longitudinal Valley Fault (LVF), Taiwan, for my PhD Thesis (3 weeks). The goal of this study was to investigate the potential factors that favor aseismic slip on the LVF based on structural and micro-structural analysis of the various formations along the LVF and of rocks from the fault zone. I conducted two fields surveys (see also April 2010) and one core sampling to study the different units of the Coastal Range. I did field mapping and structural anaylsis, which helped to construct a tectonic scenario to better understand the stratigraphic relations between the different units. I also performed a detailed micro-strucutral analysis using high-resolution SEM combined with Energy-dispersive X-ray spectroscopy (EDS), as well as electron probe micro-analyzer for imaging the fault rock microstrures and determining the mineral phases of the Lichi samples from the fault zone. This work has been published in Tectonophysics (*Thomas et al.*, 2014).

November 2011: As the teaching assistant of Pr J. Kirschvink I organized (logistic, course content) a 4-days field trip to Baja California (Mexico) for the Ge136 course. The goal of this field trip was to study the regional field geology. On top, each student was assigned the responsibility of being the resident expert on a pertinent subject for the trip: that could includes geology, geophysics, geomorphology and geobiology.

May 2011: As a teaching assitant of Pr. B Wernicke I co-organized (logistic, course content) with the others TA the 3-days Grand Canyon field trip (Colorado) for the Ge1 course. During the Field trip we cover regional field geology and discuss the genesis of the grand canyon.

April 2010: Field work (10 days) related to my PhD Thesis on the longitudinal valley fault (Taiwan). I sampled the different formations of the Coastal Range to characterize their petrographic content and to indentify the potential minerals that could explain the shallow creep of the Longitudinal valley Fault. I also performed X-ray powder diffraction analysis of some oriented clay from the Lichi Mélange samples.

March 2010: As a teaching assistant for Pr. J.-P. Avouac I organized a 3-days field trip to the Owen's Valley (California) for the Active Tectonic course (Ge177). During this field trip we studied the regional field geology and we sought for markers of active tectonic porcesses (offset of alluvial fans, offset of moraines). This field trip was combined with a lab analysis of the available Digital Elevation Model (DEM) and optical images (Aster, SPOT), using ArcGIS (an Geographic Information System).

July-August 2007: I worked for the Bureau de Recherche Geologique et Minière" (BRGM), the french equivalent of BGS and USGS, during 2 months. The goal was to create a data bank on gravitational instabilities in Finsitère, (France). I mapped local landslides and I characterized their associated hazard. This work was further used to draw a "hazard map" for this area.

February 2007: Theory and application of basic geophysical field techniques consisting of a comprehensive survey of a particular field area using GPS and seismic data. I used seismic-refraction method to image sand beach deposits and the underlying bedrock. The kinematic GPS equipment was used to compute a DEM for the area.

September 2006: 7 days of geological and structural mapping in a metamorphic area (Cotes d'Armor, France). The goal was to make a petrographic and a structural analysis of the area and to complement our observations with laboratory studies. The field work involved structural measurements, cross-section and rock sampling. I complemented the field study with a thin sections analysis, a macroscopic petrography study and I used stereonet to define the deformation field. This work has been evaluated through a geological synthesis based on those observations and a careful analysis of the published literature.

April 2006: For a master research project, I used SPOT5 satellite images to characterize the displacement fields due to active landslides in the Ubaye valley (French Alps). This research project aimed to evaluate the potentialities and the limitations of using optical imagery for landslide monitoring. For that purpose, I applied a correlation technique on sequential images in order to detect and quantify the gravitational instabilities. To complement

this study I did field mapping to describe the landslides. We also acquired optical images, with a better spatial resolution than SPOT 5, using a drone. I used field observations to define a preliminary hazard map based on geological features. The goal was to define the potential areas where we can detect other landslides by optical correlation methods.

February 2006: Marine geophysics training: study of the principles and procedures involved in geophysical exploration. The field class covered acquisition, processing and interpretation of marine seismic-reflection data (4 days). We also acquired the bathymetry of the area and collect samples.

September 2005: 7 days of geological and structural mapping in a sedimentary area (Finistère, France). The goal of this field trip was to write a geological synthesis based on field observations and laboratory studies. In the field, I made structural measurements, I drew cross-sections and I sampled the lithological formations. I complemented the field work with a thin sections analysis, a macroscopic petrography study, and I used stereonet constructions to characterize the deformation field. Available literature was also used to support the geological synthesis.

May 2005: 10 days of advanced field class in structural geology, in the french pre-Alps around Vesc. We performed a geological and structural mapping study and a macroscopic petrographic analysis. The goal was to draw a geological map and to write a geological synthesis based on field observations. This work was then used to discus topical problems related to the Alps genesis.

May 2005: 10 days of advanced field trip in an igneous area, Chélade, Massif Central, France. We performed a geological and structural mapping study and a macroscopic petrographic analysis. The goal was to draw a geological map and to write a geological synthesis based on field observations. This work was then used to discuss topical problems related to the Massif central genesis (French igneous province).

March 2005: 7 days of field mapping and supporting laboratory studies in topical problems related to Ouessant (french isle) tectonics and petrogenesis. Filed work involved structural and petrographic analysis, drawing cross-sections and sampling the lithological formations. This study was complemented by a thin-sections analysis and I used stereonet to defined the deformation field. The final goal was to write a geological synthesis based on those observations and the existing literature.

September 2004: Acquisition, processing and interpretation of gravity, magnetic, electrical data to characterize a dyke intrusion of dolerite inside a sedimentary formation. I also performed a petrographic study.

May 2004: 5 days of field trip to draw a geological map in a faulted, folded, sedimentary environment (Crozon's peninsula, France). In the field we learned out to draw cross-section, take structural measurements, perform geological mapping and sample the lithological formations. We had to write a geological synthesis at the end of this field trip.

References

Thomas, M. Y., J.-P. Avouac, J.-P. Gratier, and J.-C. Lee (2014), Lithological control on the deformation mechanism and the mode of fault slip on the longitudinal valley fault, taiwan, *Tectonophysics*, (0), –, doi: http://dx.doi.org/10.1016/j.tecto.2014.05.038.