Subject offered for a contract starting October 2017

SUBJECT TITTLE:

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Host lab/ Team : *please fill in and leave out meaningless information*
IPGP- Tectonique – UMR7154
IPGP – Sismologie - UMR7154

Financing: Doctoral contract with or without teaching assignment

For more information go to http://ed560.ipgp.fr, section: Offres de these (PhD offer), You must apply on the Doctoral School website

Presentation of the subject: (1 or 2 pages)

Seismotectonics of Mongolia:

Mongolia is located between the Siberian craton, to the North, where almost no deformation occurs, and the Tibetan area, in a broad sense, which accommodates the collision between India and Eurasia. Mongolia is often considered as the northern most outpost of the collision zone. Hence rates of deformation along crustal faults in Mongolia are slow. These crustal faults, however, have proved very active during the last century with 4 magnitude 8 earthquakes during the last century, in 1905 (2 events), 1931 and 1957. These earthquakes have produced large surface ruptures with significant surface deformation, which has been mapped in great details by our group during the last few years.

In addition to these major earthquakes, Mongolia is also characterized by some significant microseismicity, which origin is not well known. Part of this microseismicity could actually be related to some long term aftershock activity associated to the large events.

In this work, based on agreement between IAG and IPGP, we propose to take benefit of the access to the full catalogue of microseismicity recorded both by the permanent network and by temporary networks to look more carefully at the microseismicity in Mongolia. One first target will be to look at spatial and temporal distribution of the microseismicitry to unambiguously discriminate what is background seismicity and what is potentially still related to the major earthquakes of the last century. Relocation of the microseismiciy using the sate-of-the-art tools (relative relocation, double differences…) will be used to constrain at best the geometry of the microseismicity distribution. Once this

geometry will be constrained, correlation with the known geometry of the fault will be establish to see if some meaning full pattern can be isolated.
An other aspect of this work will be focus on the 1957 M8 Gobi Altai earthquake. Slip distribution at surface and surface ruptures have been established in the last years by our group. Using historical seismograms, already collected, part of the project will be to focus on cinematic modeling of the source processes that would incorporate information from seismology and from surface observation.

The PhD will be done in the framework of cooperation between Institute of Astronomy and Geophysics (IAG) in Mongolia and Institut de Physique du Globe de Paris (Paris). The PhD candidate will share his time between the two institutes following a schedule agreed at the time of PhD start.