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Mechanical constrains on LANF using visco-elasto-plastic rheology- Insights from the Gulf of Corinth and Tinos Island

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We run numerical models in which, we compute the evolution of stress within and outside the shear bands using fully visco-elasto-plastic rheology. We show that:
- Low angle normal faults may only play in the brittle at relatively high confining pressure.
- high angle dipping normal fault and low angle dipping normal fault develop opposite pressure gradient with their surrounding while they play. Hence, LANF build up the pressure as they play and therefore favour the occurrence lithostatic fluid pressure in the rocks.
- At the moment they cross the brittle ductile transition, the high angle normal faults have a tendency to harden while low angle normal faults get weaker right away.
These results may provide an explanation why at the depth of the BDT, it may be easier to reactivate lithological contact then to continue playing on high angle faults. Comparing the models with the well documented detachment fault of Tinos Island which main outcrops (at and near Planitis Island) outline principally the zone at which the LANF crosses the BDT (brittle ductile transition). We find that the brittle increments of displacement on the LANF are genetically linked to veins which were originally formed at high angle with the LANF (Mehl et al.). This observation strongly suggests that those faults have played in the brittle at low angle without rotation. However, the cumulated displacements in the brittle field are small and is also associated with the neoformation of high angle normal faults which is compatible with our model.
In the western part of the Gulf of Corinth (suspected to be the place where a “brittle” LANF is currently active) the seismic activity shows that the earthquakes are mul-

tiplets which take place on vertical planes of approximately 1 km displaced at each event by 1mm to a cm. Those observations are clearly compatible with those observed in the hanging wall of Tinos Islands detachment which is crosscuted by conjugate sets of strike-slip faults which show small cumulated displacement. Our modelling study as well as the data suggest that very little cumulated brittle deformation occurs on LANF but that it may be responsible for strain partitioning in the crust.