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Interactive comment on "Focal mechanisms in the Southern Aegean from temporary seismic networks – implications for the regional stress field and ongoing deformation processes" *by* W. Friederich et al.

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Response to comments of referee 1

- *In summary, I think that this paper defines a new standard on the kinematics of the study region obtained from earthquake recordings and certainly will be followed by more studies using the Egelados data base. In that respect I would encourage the authors to also include a statement on whether the earthquake waveform data base is available to the community.*

In the meantime, the EGELADOS data are openly available via the GEOFON data center.

Response to comments of N. Houlié

- *How about defining tectonic blocks based on the stress tensors analysis completed at the local scale? Stress tensors are the measure of the local stress field ($L < 20$km). We can consider the rupture initiation area of large events ($Mw > 7.0$) are of the same order of magnitude. A rupture corresponding to a magnitude of M3.8 (the lowest magnitude considered in this study) does not rupture a fault area larger than 1 km2 (Wells and Coppersmith, 1994). If, at the regional scale, stress axes are compliant with such local stress measurements, here is your result, and we need to know how it is possible. Many hypotheses could be invoked (complexity of the crust, faults inherited from previous tectonic phases, etc.) to explain discrepancies between the stress fields at two various scales. Recent works have shown that when strain, strain rate and stress fields are in agreement, some science can be achieved (Houlié and Stern, 2012).*

  We are not sure whether it makes sense to define tectonic blocks in the south-eastern Aegean from 11 stress measurements based on shallow earthquake clusters and 3 additional ones based on intermediate depth earthquake clusters. We will consider this point in the revised version. Of course, we can compare the stress field with the GPS strain field, at least the horizontal projections of the eigenvectors, and search for correlations.

  We would also like to comment on a remark in the annotated manuscript which refers to the assumption of a homogeneous stress field when determining stress tensors from focal mechanisms. Stress determinations always require a few tens of earthquakes to constrain a single stress tensor. Therefore, there is no way

around assuming that at least these earthquakes happened within a homogeneous stress field. In our case, this assumption applies to the regions occupied by the earthquake custers. Homogeneity of stress within these regions cannot be the result of stress analysis but always a precondition for doing stress analysis. On the other hand, our results show quite clearly that the stresses are not homogeneous on the regional scale.

- *Minor comments*

  We will honour the suggestions made under minor comments, in particular showing GPS surface velocities as well as seismicity, reorganization of the contents and packing all the stress solutions into a tar ball. The localization error of 20 km refers to the maximum diameter of the 3D error ellipsoid. Lateral uncertainties of localizations are typically smaller than 20 km. Furthermore, the localization error is taken into account by the HASH method we use for focal mechanism determination and is reflected in the quality ranking of the focal mechanisms. We have exlcuded all solutions of lowest quality class D, thereby also eliminating events where the localization error could impact the focal mechanism. For the solutions obtained by waveform matching, we only took focal mechanisms for which either an acceptable waveform fit could be achieved or a relocation was successful.

Interactive comment on Solid Earth Discuss., 5, 1721, 2013.