

EARTHSCOPE SEMINAR

DISCUSSION SUMMARY

MARCH 19, 2007

PRESENTER: JOHN D. WEST

NOTE-TAKER: SHAJI NAIR

Paper Title: Rotation and Plate Locking at the Southern Cascadia Subduction Zone.

Authors: Robert McCaffrey, Maureen D. Long, Chris Goldfinger, Peter C. Zwick, John L. Nabelek, Cheryl K. Johnson, and Curt Smith

The authors in this paper present results from simultaneous inversion of GPS data and surface tilt meter data, that is in tandem with previous results from the area, suggesting that majority of the plate locking along the southern Cascadia Subduction zone occurs offshore. The authors also based on observations from GPS measurements and tectonic settings infer that coast parallel traction associated with oblique subduction of the Juan de Fuca plate under the forearc is probably not the only source driving block rotation. They are of the opinion that Oregon's sense of rotation and its lack of rapid internal deformation warrants that it is moving in response to the Basin and Range extension to the southwest.

In discussing the paper and deciphering the boundary conditions in order to understand how it affects the geometry of the model the group singled out how the earthquake record from the area match the moment analysis and the significance of one on the other.

An interesting point in terms of the significance of record preservation was brought about by explaining how a turbidite sequence heavily depends on its exposure prior to the occurrence of any new event. Non-preservation of such turbidite sequences leads to no match between moment analysis and earth record/predictions.

Another important point raised during discussion was the significance of tilt data and how much data was actually sufficient to support such a model. Since the tilt surveys measure a change in elevation with change in time it was unanimously agreed upon that the more spatial coverage with more data points would help constrain the model to a greater extent. Also there were suggestions that addition of tilt survey lines to the south especially in areas where they report less locking would be an interesting addition to the current data set in order to watch how it would influence the results pertaining to the best-fit model.

The basic conclusion from the discussion was that there were problems with the model and even though the model presents a best fit to the data the model is not well constrained with differential depths hence cannot be used to explain the physicality of the model.