**Paper No. 20-1**

**Presentation Time:** 8:30 AM-8:50 AM

# *TESTING SPATIAL CORRELATION OF INTERPLATE COUPLING AND FOREARC MORPHO-TECTONICS: A NEW MODEL FOR COMPARATIVE SUBDUCTOLOGY BASED ON HIGH RESOLUTION DIGITAL ELEVATION DATA*

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The largest earthquakes on earth (e.g. Mw 9.2, Alaska, 1964, Mw 9.5, Chile, 1960) occur in the seismogenic plate interface of subduction zones. It has long been theorized that the catastrophic failure of a locked zone along the contact between the two plates causes these earthquakes, although determinations of the position, attitude, and extent of this locked zone are varied. Some researchers attribute the boundaries of the locked zone to temperature and heat flow, others to lithological and/or phase change regions, and still others to the angle of the subducting slab. In addition to a locked zone, most subduction zones also contain common surface morphological features: a pair of fore-arc highs and basins, and a volcanic arc. Correlations between the spatial position of these morpho-tectonic features and the underlying locked zone are investigated for the Cascadia, Aleutian/Alaska, Central America, Southern Chile, Makran, Nankai, and Sumatra subduction zones. Spatial associations were examined with the spatio-analytical tools of Geographic Information Systems (GIS), and seismic and geodetic data were integrated with NASA Shuttle Radar Topography high-resolution digital topographic data. Correlations between forearc morpho-tectonics and subduction interplate coupling via integration of primary geophysical observations and digital topographic data provide insight into potential for great earthquake generation within the seven subduction zones.

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