



Inter-plate coupling and two likely future great earthquakes along the South America subduction zone

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Inter-plate coupling along the South America subduction zone is analyzed through the measure of “trench parallel Bouguer anomaly”, the so called TPBA. Mapping of the TPBA along the plate interface enables us to detect the location of asperities, subducted ridges and sea-mounts. The coupling along the South America subduction zone not only controls the associated great earthquakes, but also it determines the topography of the over-riding plate, notably the prominent Longitudinal Valley. Joint analyses of the TPBA, seismicity patterns in time and space, as well as the location of major geomorphologic features allow us to make interpretations on the current status of the earthquake cycle along the segments of the subduction zone where likely future great earthquakes are expected to occur. Here we focus on the status of asperities and the preparatory phenomena to spot and limit two future great earthquakes along the coasts of Chile.

The likely magnitude, initiation point, extent of rupture area, and location of main energy release (asperity) for these two earthquakes will be discussed. The northern suggested area is limited between latitudes of 19.5 to 23.5 degrees south, with two main asperities located between 21 to 23 degrees south. Given the size of the proposed rupture area and the asperities, a magnitude of 8.5+ is expected for this segment.

The southern suggested area is limited between 30 to 33 degrees south. Major parts of this area ruptured during April 6, 1943 (M=7.9) Illapel earthquake. Considering an average return period of 80 years in this area, the likely occurrence of a similar size earthquake along the same segment is increasing.