Geophysical Research Abstracts
Vol. 20, EGU2018-15337-1, 2018
EGU General Assembly 2018

The link between megathrust segmentation and upper plate faulting along the N-Chilean subduction system

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Narrow zones of lower coupling along the North Chilean subduction zone that stop most seismic ruptures are often accompanied by irregular features in the forearc morphology such as the Mejillones Peninsula (Metois et al., 2012; Victor et al., 2011). Compiling data from high resolution satellite images, seismic catalogues and field investigations, we have created a detailed map of active upper plate faulting between the latitudes 19°12'S - 25°12'S. This map yields evidence for further segmentation of the Atacama Fault Zone (AFZ) that provides information of potential additional segmentation of the underlying megathrust now confirmed by the southern termination of the 2014 Iquique earthquake. Fault activity patterns are mapped according to a well-defined set of criteria. The database for activity starts out from a thorough literature review but is most importantly supplemented by new evidences combining field data and seismicity data from the IPOC and Bloch et al. (2014) catalogues. From the combination of several datasets we propose that an abrupt cutoff of upper plate seismicity correlates with the southern termination of the 2014 Iquique rupture. This clear cut termination is further confirmed by the presence of the Adamito Fault, a deep-rooted EW thrust fault at 21°35'S and the lack of upper crustal fault activity further south, clearly demonstrating the link between upper plate fault activity and the megathrust segmentation.