

**OBSERVATION OF THE RAPID PLUNGE/ROLLBACK
OF THE SLAB AND RUPTURE OF THE OVERRIDING PLATE
AFTER AN INTERMEDIATE-DEPTH EARTHQUAKE :
A POSSIBLE MECHANISM FOR
THE AD 365 GIANT TSUNAMI EARTHQUAKE IN GREECE**

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The devastating tsunami earthquakes of 2004 in Sumatra and 2011 in Japan came as shocks to the scientific community which had not expected the giant size of these events. The prevalent view of the existence of a characteristic earthquake cycle for a given region led to discard peculiar events from the distant past on grounds that they were too poorly known to be usable. The giant tsunami earthquake of 21 July 365 AD in Greece which uplifted part of Crete by $\sim 9\text{m}$ and devastated coastal areas of Eastern Mediterranean stands as one remarkable such event. How such a large earthquake occurred in a mostly aseismic subduction is an enigma. We show here that a sequence of unusual events in this subduction in 2008 sheds light on the mechanics of this giant event. Following a moderate rupture of the deep slab, the slab and overriding plate deformed in a few weeks over a zone $\sim 250\text{km}$ wide extending from $\sim 100\text{km}$ depth to sea bottom. These observations show that the slab can break, deform and plunge very rapidly over a huge area, producing the immediate rupture of the overriding plate. The chain of events seen in 2008 seems to contain many of the ingredients needed to produce a large tsunami earthquake in an aseismic subduction. We postulate that an acceleration of this chain caused by a large rupture of the deep slab led to the AD 365 event.

