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Title: New Geological Evidence of Past Earthquakes and Tsunami Along the Nankai Trough, Japan

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Abstract

The east coast of Japan is prone to tsunamigenic megathrust earthquakes, as tragically demonstrated in 2011 by the Tōhoku earthquake (Mw 9.0) and tsunami. The Nankai Trough subduction zone, to the southwest of the area affected by the Tōhoku disaster and facing the densely populated and heavily industrialized southern coastline of central and west Japan, is expected to generate another megathrust earthquake and tsunami in the near future. This subduction zone is, however, segmented and appears to be characterized by a variable rupture mode, involving single- as well as multi-segment ruptures, which has immediate implications for their tsunamigenic potential, and also renders the collection of sufficiently long time records of past earthquakes and tsunami in this region fundamental for an adequate hazard and risk assessment. Over the past three decades, Japanese researchers have acquired a large amount of

geological evidence of past earthquakes and tsunami, in many cases extending back in time for several thousands of years. This evidence includes uplifted marine terraces, turbidites, liquefaction features, subsided marshes and tsunami deposits in coastal lakes and lowlands. Despite these efforts, current understanding of the behaviour of the subduction zone still remains limited, due to site-specific evidence creation and preservation thresholds and issues over alternative hypotheses for proposed palaeoseismic evidence and insufficiently precise chronological control. Within the QuakeRecNankai project we are generating a long and coherent time series of megathrust earthquake and tsunami recurrences along the Nankai Trough subduction zone by integrating all existing evidence with new geological records of paleo-tsunami in the Lake Hamana region and of paleo-earthquakes from selected lakes in the Mount Fuji area. We combine extensive fieldwork in coastal plain areas and lakes, with advanced sedimentological and geochemical analyses and innovative dating techniques.

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