Geophysical Research Abstracts
Vol. 15, EGU2013-1571, 2013
EGU General Assembly 2013

The rogue wave of 27 August 1969 at Dwarskersbos, South Africa: Field survey and simulation as a meteo-tsunami

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In the early hours of Wednesday, 27 August 1969, the village of Dwarskersbos, Western Cape, South Africa, was inundated by a wave which flooded houses and
damaged small boats.
This small tsunami took place in the absence of any seismic source or extreme weather, and its origin has remained mysterious.
In September 2010, we conducted a field survey based on the interview of nine elderly witnesses still living in the village, using techniques developed earlier for the study of the 1946 Aleutian and 1956 Greek tsunamis.
We measured 13 locations, with run-up reaching 2.9 m for a maximum inundation of 260 m from the sea shore. The most remarkable aspect of our dataset is the extreme
concentration of the flooding along a stretch of coastline of less than 2 km. In particular, the tsunami did not reach the communities located on the opposite side of St. Helena's Bay, nor did it affect Elands Bay and Lamberts Bay, respectively 43 and 68 km to the North.
In order to investigate the possible origin of the Dwarskersbos tsunami, we first simulated an underwater landslide taking place in a canyon 20 km Northwest of
Shelley Point, using the MOST code. This model predicts comparable amplitudes along most of the regional coastlines, and thus fails to explain the documented concentration at Dwarskersbos.
By contrast, we explore a meteorological origin for the event by simulating the coupling between a possible squall (modeled as a steep pressure front) propagating over St. Helena's Bay and the oceanic column, using Proudman's [1953]
original model, as applied by Platzman [1958] to the case of the 1954 Chicago rogue wave. We find that a front moving at 15 m/s in the azimuth N100E can resonate exclusively with the shallow bathymetry off Dwarskersbos, and thus explain most of the features revealed by our survey. This interpretation would be in contrast to the case of the tsunami of 21 August 2008, for which a comprehensive seriesof maregraphs along a 900-km stretch of coastline supports the model of distant source possibly involving slope failure of the continental margin along the Chamais Slump [Hartnady et al., 2009].