Source characteristics of the 2007 Pisco earthquake (Mw=8.0), Central Peru


**Seismo-Tectonic Context**

The 2007 earthquake...unbroken by the previous 1942 (M8.0), and 1974 (M8.0) earthquakes, borders the Nazca ridge and a kink of the coastline.

Some remarkable tectonic features:
- Flat slab N. of Nazca ridge
- Larger ruptures S. of the Nazca ridge

**Teleseismic data**

Teleseismic stations used for the inversions

- P & SH waves only
- PKP, PKS waves only
- SKS, SKKS waves only

**InSAR data**

ALOS PALSAR InSAR images

- Right InSAR image: ascending track 109 created using July 12th to August 27th frames.
- Left InSAR image: ascending track 111 created using July 24th to September 8th frames.

**Tsunami data**

This event generated a local tsunami which caused severe damage in several coastal towns around the Ica peninsula. Maximum run-up height is 10 m.

The tsunami was also recorded in deep-ocean by one DART buoy which is used by the Pacific tsunami warning system.

**Strong motions**

The event was recorded in the town of Ica (488 cm s⁻¹), but also farther north in Lima (110 cm s⁻¹). Figure above is velocity measurement at Ica in cm s⁻¹.

**Aftershocks**

The aftershocks have been recorded by a local network of the Instituto Geofisico del Peru (IGP).

**Conclusion**

- The characteristics of the 8.0 Peru earthquake of 2007 are well constrained from the seismic, InSAR and tsunami data.
- The rupture areas of the large earthquakes offshore Peru over the last 60 years are paving the megathrust
- Rupture did not extend to the trench and could be bounded down-dip by the coast line (InSAR track 109 to be included in the inversion).
- Asperities seem to match areas of lower aftershock activity.
- Rise time of the first sub-event is short (less than a few seconds), confirmation that south of 12°S, earthquakes tend to rupture to the...south.