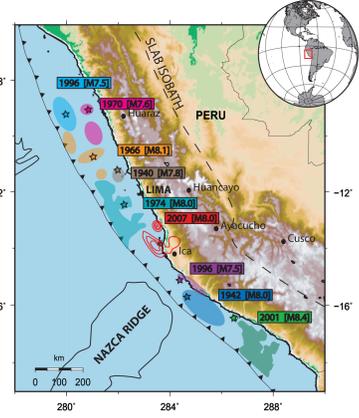


AVAILABLE DATASETS

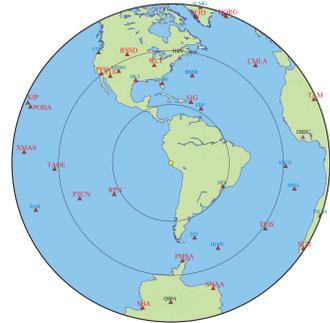
Seismo-Tectonic Context

The 2007 earthquake:
_falls in an area that was left 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,



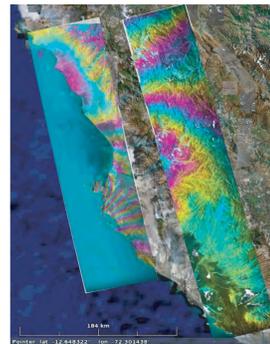
Teleseismic data



Teleseismic stations used for the inversions

PMSA : P & SH waveforms
HOPE : P waveform only
DBIC : SH waveform only

InSAR data

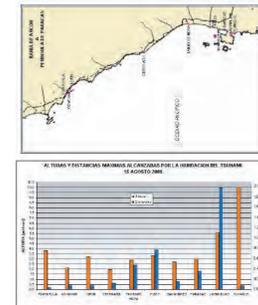


ALOS PALSAR InSAR images

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

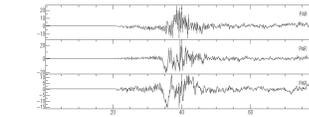


This event generated a local tsunami which caused severe damage in several coastal towns around the Ica peninsula. Maximum run-up height is 10 m.



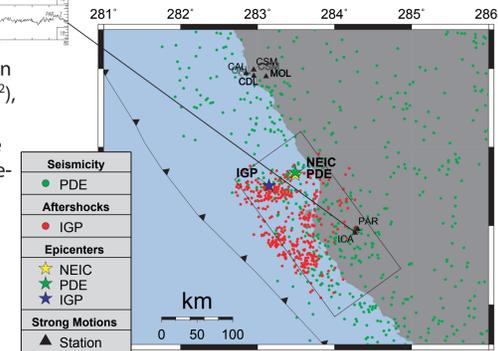
The tsunami was also recorded in deep-ocean by one DART buoy which is used by the Pacific tsunami warning system

Strong motions



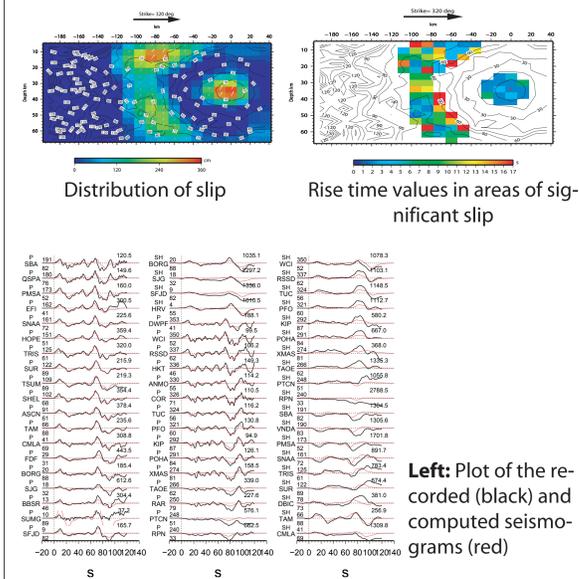
The event was recorded in the town of Ica (488 cm.s⁻²), but also further north in Lima (110 cm.s⁻²). Figure above is velocity measurement at Ica in cm.s⁻¹.

Aftershocks



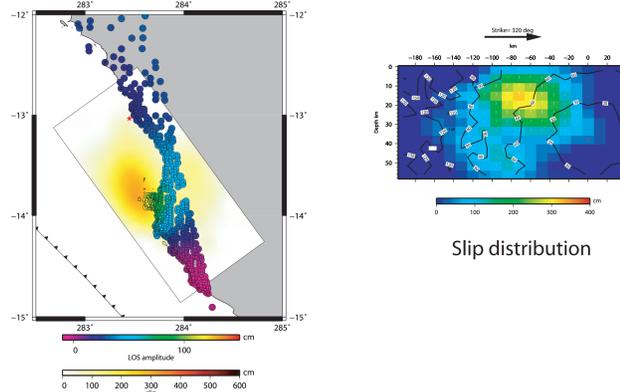
The aftershocks have been recorded by a local network of the Instituto Geofísico del Perú (IGP).

Teleseismic Inversion



Slip distribution obtained from the inversion of the teleseismic data

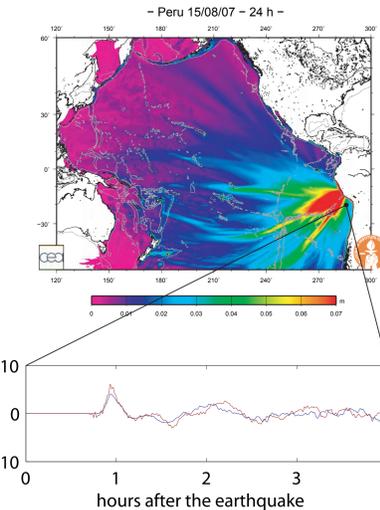
Inversion of InSAR data



Map view of the slip distribution obtained from the inversion of InSAR data. The colored dots represent the ground motion in the LOS, with the inside dots representing the motion predicted by the solution.

Preliminary DART Inversion

We inverted the deep-ocean tsunami record provided by the DART buoy 32401 using a coarse fault plane discretization to see how tsunami data could help resolve the offshore slip distribution.



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.

Joint Teleseismic + InSAR inversion

