go-stochastics

A GEOUMA SCIENCES SERVICE

PRODUCT SHEET

El Niño Synthetic Flood Event Catalogue: Peru

14,985 synthetic years conditioned on El Niño · ~15,000 event maps at 12 m · portfolio loss analysis

14,985	638,972	266,430	1,268	10–1,000	6
synthetic years (Dec–May)	synthetic storms	flood-producing storms	river sub-basins	years return period	ENSO year types

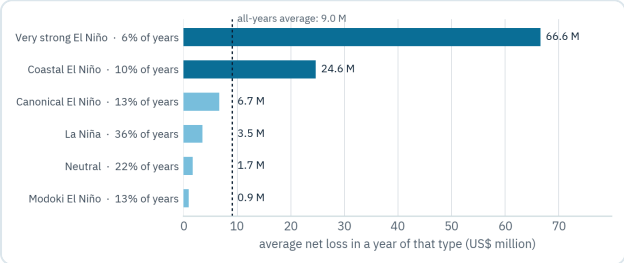
What it is

A catalogue of **synthetic storms and river floods for the whole of Peru**. It starts from 14,985 rainy seasons in which El Niño is simulated consistently on the coast (ICEN, ENFEN definition) and in the central Pacific (Niño 3.4). Each season has its storms, built from the storms observed in PISCOp v3.0 (1982–2025), and each storm has its 12 m flood map, produced with the **HAND method**.

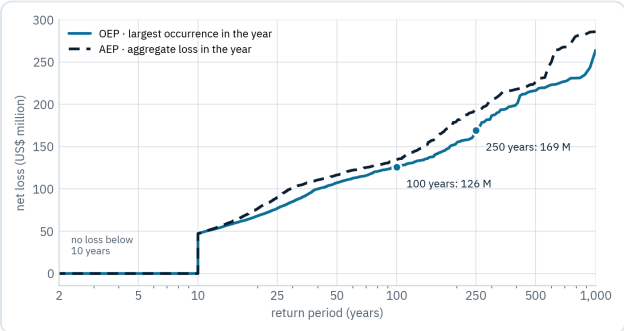
What it is for

- **Portfolio loss curves**: AAL, OEP and AEP from 2 to 1,000 years.
- **El Niño-conditioned view**: risk by year type (very strong, coastal, canonical and Modoki El Niño, neutral, La Niña), useful when ENFEN or NOAA announce an event.
- **Scenarios**: event maps for accumulation control, contingency planning and stress tests.
- **Historical as-if**: what today's portfolio would lose with 1983, 1998, 2017 or 2023.

Example · fictitious portfolio in Piura



AAL BY YEAR TYPE 1,500 locations and US$ 587 M insured. Net AAL of US$ 9.0 M; in a very strong El Niño year, US$ 67 M on average.



OEP AND AEP CURVES Worst occurrence: US$ 126 M at 100 years and US$ 169 M at 250 years.

Return periods

- **Hazard**: eight depth levels from 10 to 1,000 years (10, 30, 50, 100, 200, 250, 500 and 1,000).
- **Losses**: OEP and AEP curves from 2 to 1,000 years over 14,985 years, overall and by year type.
- **Events**: each map gives its maximum return period and its annual frequency in the catalogue.

Formats

- **Event maps**: one GeoTIFF per event, depth in metres at 12 m, EPSG:4326, one folder per year type. Open directly in QGIS, ArcGIS Pro or Python.
- **Event index** (CSV): ICEN, Niño 3.4, date, duration, maximum return period, flooded km² and annual frequency.
- **Hazard by sub-basin** (Parquet): return period of each storm in each sub-basin.
- **Losses** (CSV): occurrence table (168-hour clause), year loss table (YLT), return-period curves and historical as-if.

Portfolio analysis service

What you send: a shapefile, GeoPackage or Excel/CSV file with latitude and longitude, sums insured (physical damage and business interruption), limits, deductibles, occupancy and construction type. No proprietary format needed.

What you get:

- Net AAL and OEP/AEP curves after deductibles and limits, with a 168-hour clause.
- The same metrics by ENSO year type.
- Historical as-if 1982–2025 and the largest occurrences in the catalogue.
- AAL by location and by sub-basin, and which locations lie in flood-prone areas.

Validation and scope

- Storm counts per season validated in all 6 regions; 100-year rainfall within ±15% of regional frequency analysis.
- 1998, 2017 and 2023 stand out as the most severe seasons; 1983 is underestimated because its rain accumulated over months.
- Claims calibration in progress. No flooding below 10 years.

Ask for a demo or a quote.
www.go-stochastics.com · garyosmaston@go-stochastics.com

Development version, not yet calibrated against claims. Hazard: river flooding only (excludes pluvial flooding, debris flows and coastal flooding). Vulnerability: JRC depth–damage curves for South America (Huizinga et al., 2017). Example figures are illustrative: fictitious portfolio, no client data.