El Niño 1997-98
Canonical, Very strong
Guayaquil-Salinas area. Floodings.
Agenda

1. What is ERFEN?
2. Observing network and services
3. Present work and future challenges
1 What is ERFEN?


* It is centered on El Niño-Southern Oscillation (as the most prominent mode of climate variability in the Southeastern Pacific).

* It comprises:
  - Executive unit and Coordination
  - Regional Scientific Comitee
  - National Comites
  - Especialized Institutions

* Each country has a National Comitee. Example: Ecuador: ERFEN. Perú: ENFEN.
2 Observing networks and services

* ERFEN is a regional framework for to ensure the observation and forecast of El Niño, based on national capabilities. Coordinator (in each country): National Centres of Oceanography (in CPPS area: Navy-based), Meteorology and Hidrology, Fisheries, Universities and Risk Management.

* ERFEN Ecuador
  - Instituto Oceanográfico de la Armada Inocar
  - Instituto Nac de Meteorología e Hidrología Inamhi
  - Instituto Público de Investigación en Acuacultura y Pesca Ipiap
  - Escuela Superior Politécnica del Litoral Espol
  - Servicio Nacional de Gestión de Riesgos y Emergencias Sngre

* Observational networks:
  - Offshore oceanographic stations (10 nm, monthly)
    ‘ 5 nm, weekly
  - Tide gauges network
  - Sea level-altimetry (Equatorial Pacific)
  - Oceanographic Cruise (once a year)
  - Meteorological stations
  - Satellite information (ocean-atmosphere)

* Modeling:
  - Mostly for atmosphere. Inamhi and Inocar WRF runs. Emphasis on precipitation. Short time, better.

* Expert analysis:
  - Assessment of the ocean-atmosphere situation. National, regional and international info. Emission of ENSO Climate Perspective one month/season ahead.
2 Observing networks and services

Tumaco offshore station
CCCP Colombia.
ERFEN national comitee

RV Orión
INOCAR Ecuador.
ERFEN national comitee

Quijos hydro station
INAMHI Ecuador

Cotopaxi meteo station
INAMHI Ecuador
2 Observing networks and services

left
BAC Climatic Alert Bulletin (regional)
Issued monthly

right
ERFEN bulletin (national)
Issued monthly / on rainy season, each 15 days.
3 Present work and future challenges

(from a national perspective)
* ERFEN Ecuador was constituted (formally) as National Comitee from 2001. Since then (21 years), provides to society and decision makers climate information and ENSO perspectives. This helps to prepare and take measures in order to reduce the impacts of extreme events associated to El Niño.

* During decade 2011-2020, the relation between especialized institutions and National Risk Management Agency were improved.

* Other regional projects helped to develop and sustain the observational network (i.e.: Tsunamis EWS --> tide gauge --> coastal sea level monitoring).

* The institutions and their observing network are not crisis-proof. Global crisis (i.e. 2008), pandemics, and global conflicts always remind us. Sustainability.

* Climate Change poses a new dimension over our El Niño-driven climate variability.
  b. Occurrence of “Coastal El Niño”. Favoured by “ENSO cold phase - La Niña” conditions.
  d. These mean that, whatever the ENSO phase, it is possible that some extreme events (of precipitation) occurs.
3 Present work and future challenges

* La Niña-like condition in the last decade worsen the water deficit in areas normally exposed to drought. Example: Loja-Zapotillo (South of Ecuadorian Andes). In a broad-scale, the Chilean Mega-drought is influenced by this long-term condition.

* On the horizon: TPOS 2020, and a sustainable ocean observing network for the Equatorial Pacific. TAO 2.0


* Seasonal forecast: useful. But not enough.
* Subseasonal forecast: can provide a better insight on the highly-variable precipitation we observed recently.

3 Present work and future challenges

Some conclusions over the three last years

<table>
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<tr>
<th>Rainy season</th>
<th>Tropical Pacific</th>
<th>Eastern Pacific</th>
<th>Impacts</th>
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<tr>
<td>2020</td>
<td>ENSO neutral</td>
<td>Rapid Ocean Warming</td>
<td>March: drier than normal</td>
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<td>Observation of extreme events (Feb)</td>
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<tr>
<td>2021</td>
<td>ENSO cold phase (weak)</td>
<td>Rapid Ocean Warming + strong MJO</td>
<td>March: enhanced rainy season</td>
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<td>2022</td>
<td>ENSO cold phase (weak)</td>
<td>Rapid Ocean Warming</td>
<td>March: rebounded rainy season</td>
</tr>
<tr>
<td></td>
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<td>Observation of extreme events</td>
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</tbody>
</table>

* (Concentrated) Rainy season in Ecuador: February, March, April. 70% of the annual precip occurs

ENSO, diagnosed correctly by ERFEN committee.
Solved seasonal. Not very effective on a reduced time scale.
Warning of extreme events (rain, storms), by Meteo Alert Bulletins from Inamhi.

Strong La Niña --> water deficit, drought (by sure). i.e.: 2000.
Weak La Niña --> variable rain over the territory. The occurrence of extreme events is not ruled out. Areas id as drought-threatened are more prone to be affected by water deficit.
La mayor lluvia del 2021 en Guayaquil provocó afectaciones en 64 zonas, entre inundaciones, árboles caídos, canales rebosados y otros.

Durante lluvias se registraron viviendas y calles inundadas, intenso tráfico vehicular, árboles caídos.

2021 Rainy season
Tropical Pacific: ENSO cold phase (weak La Niña)
Guayaquil. Urban flooding.

Better monitoring and predictions
Reducing vulnerabilities, increasing resilience
Articulated interinstitutional work

Reducing impacts and saving lives!

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