



## COMITÉ MULTISECTORIAL ENCARGADO DEL ESTUDIO NACIONAL DEL FENÓMENO EL NIÑO (ENFEN)

### ENFEN OFFICIAL STATEMENT No. 15-2015

*Peruvian Governmental Assessment on El Niño-Southern Oscillation*

Note: This translation is provided for convenience, but the official original version is in Spanish

### Status warning system: **Coastal El Niño<sup>1</sup> Alert**

The Multisectoral Committee for the National Study of El Niño (ENFEN) maintains the state of alert, as current conditions remain consistent with a warm event of “strong” magnitude, without presence of heavy rains but with above normal coastal temperatures.

This first phase of Coastal El Niño continues to decline slightly, but we estimate a 95% chance that the event will extend until next summer, with 55% chance that in this second phase the Coastal El Niño **may reach the magnitudes observed in summer 1982-1983 or 1997-1998.**

The Multisectoral Committee for the National Study of El Niño (ENFEN) met to review and update the meteorological, oceanographic, biological-fishery and hydrological conditions of August 2015.

In the central Pacific (Niño 3.4 region), the sea surface temperatures (SST) anomalies continue to increase, exceeding +2 °C after the second week of August. The strong large-scale coupling between the atmosphere and the ocean, i.e. westerly winds, convection and sea temperature, continued in the central Pacific similar, although slightly lower, than observed in 1997. Similarly, the equatorial thermocline continued tilted towards the east and, on average, deeper than normal. All this is consistent with the warm phase of El Niño-Southern Oscillation. However, thermocline depth data and equatorial mean sea level (MSL) indicate that equatorial Kelvin waves are weakened between approximately 100°W and the coast of South America, possibly due to the action of easterly winds anomalies and/or the reflection of these waves by the shallow thermocline in this region. In this moment, we observe the formation of a new westerly wind burst in the vicinity of the International Date Line.

In the coastal zone of Peru, the SST monthly anomaly averaged over the northern and central coasts was +1.8 °C, reaching + 2.2 °C in Paita and Chimbote. Along the coast, air temperatures continued above normal, similar to the previous month, with average anomalies of +1.3°C (+1.8°C) for the minimum (maximum) air temperatures. The July value of the Coastal El Niño Index (ICEN in Spanish) is 2.15°C, which corresponds to “strong” warm conditions.

The MSL was, on average, in the northern coast, around +11 cm above normal, while in the central and southern zone anomalies increased between 2 and 5 cm with respect to the previous month. After an initial decline, a recovery of the MSL positive anomalies was observed from the second half

<sup>1</sup> Definition of Coastal El Niño Alert: According to recent conditions using expert judgment in a collegial manner, the ENFEN Committee considers that Coastal El Niño event has begun and/or ICENtmp value indicates warmer conditions, and is expected that Coastal El Niño consolidates (ENFEN Technical Note N°01-2015).



## COMITÉ MULTISECTORIAL ENCARGADO DEL ESTUDIO NACIONAL DEL FENÓMENO EL NIÑO (ENFEN)

of August, probably due to the arrival of the warm Kelvin wave expected for August-September. Also, water temperature anomalies in the upper 100 meter at the oceanographic station at 7 nautical miles off Paita had an average value of +2 °C for the water column, 1°C lower than the previous month (~+3 °C).

The rain and river flows in the coastal basins were within normal in this dry season. The reservoirs in the northern and southern coasts have, on average, 82% and 59% of their maximum storage capacity, respectively.

Anchovies were present off Chimbote and Pisco, and from Ilo (17 °S) to the southernmost region. Off Chimbote they were located slightly deeper than normal, while off Pisco they were found near the surface. Biological indicators of the anchovies (gonadosomatic index<sup>2</sup> and spawning fraction<sup>3</sup>) increased, although below their historical pattern. On the other hand, the anchovies continue their reproductive maturation period before the main winter and spring spawning season. Warm water species have been observed off the central coast, such as the oceanic species *Sarda chiliensis* "Eastern Pacific bonito", *Katsuwonus pelamis* "skipjack", *Decapterus macrosoma* "mackerel scad", *Coryphaena hippurus* "Golden fish", and *Anchoa nasus* "samasa" among coastal species.

### PERSPECTIVES

In the Peruvian coast, positive anomalies of the sea surface and air temperatures, mean sea level and depth of the thermocline, typical of a Coastal El Niño event, will continue in the remainder of the winter season with a minimum value in September, corresponding to perhaps to moderate warm conditions. Currently, we estimate a 95% chance that El Niño will persist through austral summer (ENFEN Technical Note N°02-2015; Table 1).

2

We estimate a 55% chance that the coastal El Niño will reach magnitudes of "strong" or "extraordinary" this coming summer (ENFEN Technical Note N°02-2015; Table 1). For this to occur, surface warming in the eastern Pacific during October and November would have to be sufficiently strong to trigger heavy rain in this region. This would require that incoming and newly formed warm Kelvin waves would have to produce larger impacts on SST in the eastern Pacific than has been recently observed.

On the other hand, the apparent weakening of warm Kelvin waves as well as the presence of more intense trade winds and reduced SST anomalies in the eastern Pacific, could be indicative that the ocean-atmosphere coupling in this region will not be efficient enough for El Niño to reach "strong" or "extraordinary" magnitudes. We will continue monitoring and will update the probabilities according to the new data if necessary.

For the remainder of the winter, coastal warming will not produce substantial effects on rainfall, as this is the dry season. However, as the rainy season begins, the Coastal El Niño will intensify precipitation in the Pacific coast according to its magnitude and depending on seasonal hydrological characteristics of each region. While El Niño is expected to influence precipitation primarily in the northern coast, there is strong spatial heterogeneity of this impact.

For the central Pacific (Niño 3.4 region), global climate models continue to forecast the intensification of El Niño towards the end of the calendar year, peaking in November with values that could exceed

<sup>2</sup> Gonadosomatic index: Index of relationship between fish dry weight with the female gonad weight. It is an indicator of spawning activity.  
<sup>3</sup> Female spawning fraction: Spawning female percentage of analyzed samples. This index is obtained by reading the histological cuts of the female gonads (ovaries).



## COMITÉ MULTISECTORIAL ENCARGADO DEL ESTUDIO NACIONAL DEL FENÓMENO EL NIÑO (ENFEN)

+2 °C. ENFEN estimates a 75% chance that El Niño in the Central Pacific will reach “strong” or higher magnitudes (Table 2). El Niño in the Central Pacific tends to enhance precipitation in the Andes and Amazon, in November and reduce it around February, although this effect is not determining.

The ENFEN Multisectoral Committee will continue to report on the evolution of the observed conditions and will update monthly the probability estimations of the magnitude of Coastal El Niño and Central Pacific El Niño for austral summer.

ENFEN Multisectoral Committee

Callao-Perú, September 3, 2015

**Table 1.** Probability of the magnitudes of Coastal El Niño in summer 2015-2016 (December 2015-March 2016)

Magnitudes during December 2015-March 2016	Probability of occurrence
Neutral or Coastal La Niña	5%
Weak Coastal El Niño	10%
Moderate Coastal El Niño	30%
Strong Coastal El Niño	35%
Extraordinary Coastal El Niño	20%

Source: Enfen Technical Note N° 02-2015

**Table 2.** Probability of the magnitudes of El Niño in the central Pacific in summer 2015-2016 (December 2015-March 2016)

Magnitudes during December 2015-March 2016	Probability of occurrence
Neutral or Central Pacific La Niña	5%
Weak Central Pacific El Niño	5%
Moderate Central Pacific El Niño	15%
Strong Central Pacific El Niño	40%
Very strong Central Pacific El Niño	35%

Source: Enfen Technical Note N° 02-2015