



EL NIÑO AND ITS IMPLICATIONS FOR MARINE AND COASTAL SERVICES

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OUTLINE

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Heat Season Review & Cold Season Planning Regional Workshop

29 September - 01 October 2026

Introducing INCOIS

**Indian National Centre
for Ocean Information
Services**

Est. 1999

Hyderabad, India.
Autonomous body under the
Ministry of Earth Sciences,
Government of India

Early warnings

24×7 tsunami centre;
storm surge, high wave
and swell surge alerts

Ocean State Forecast

3–7 day waves, currents
and SST for fishers,
shipping, navy and coast
guard

Fisheries advisories

Daily fishing-zone
advisories in Hindi, English
and 8 regional languages;
tuna and Hilsa

Ecosystem services

Marine heatwave, coral
bleaching and algal bloom
advisories

Observations and data

Buoys, Argo floats, tide
gauges; National
Oceanographic Data
Centre

Regional role

Regional Tsunami Service
Provider; forecasts via
RIMES; IOGOOS
secretariat; ITCOcean
training

THE OCEAN NOW AND THE OUTLOOK

State of the Indian Ocean, marine heatwaves
and
what to expect this season



The Pacific: a very strong El Niño, still growing

~2.5 °C

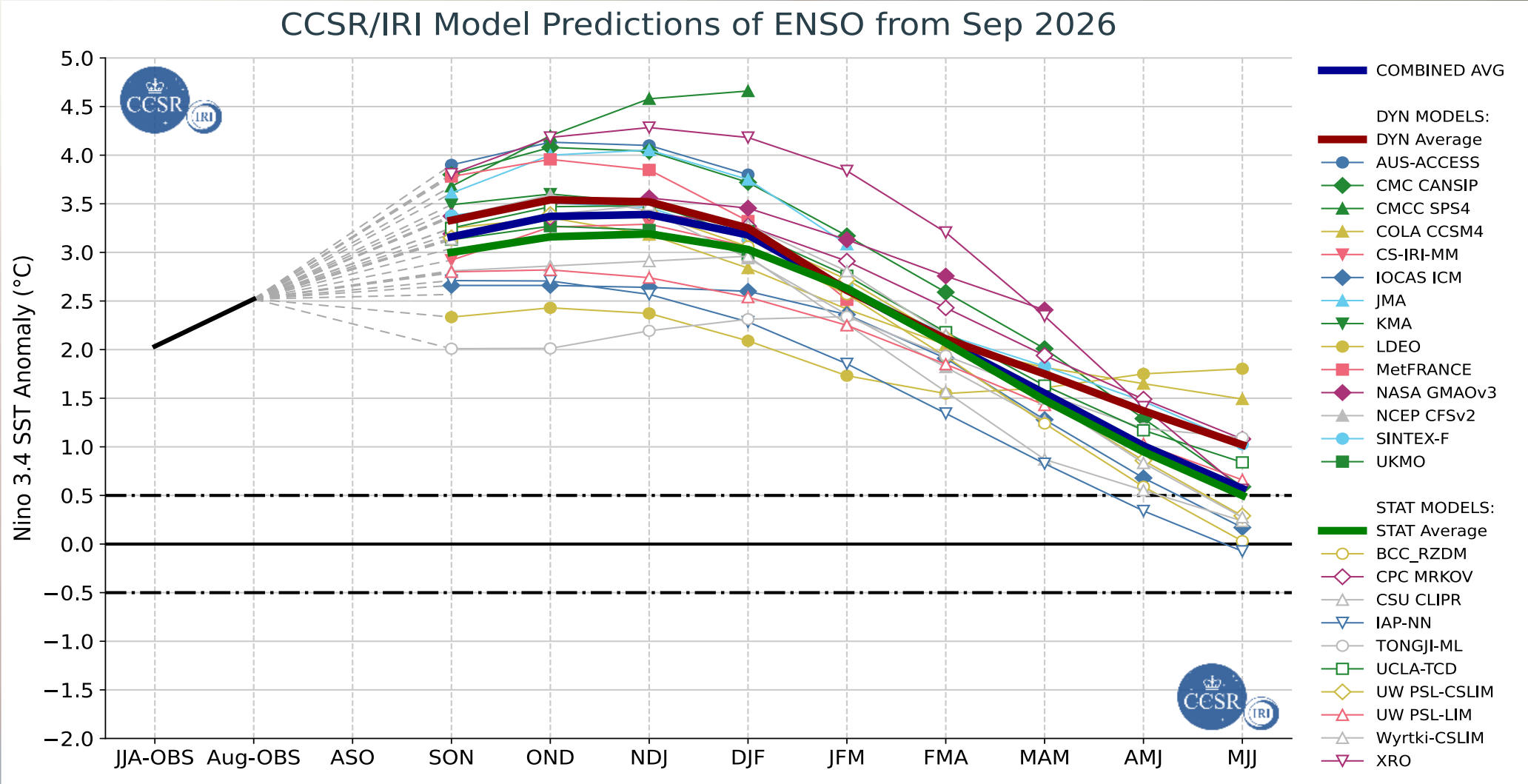
Forecast Niño 3.4 anomaly, Jun-Aug 2026 season average

~100%

Likelihood El Niño persists through Dec 2026 – Feb 2027

Nov–Dec

Expected peak, with narrow model spread and high confidence



El Niño is a Pacific event, but its effects on Indian Ocean waters are **predictable and delayed**, and that delay is our lead time.

Source: WMO Global Seasonal Climate Update and El Niño/La Niña Update, 3 September 2026

The Indian Ocean is already running hot

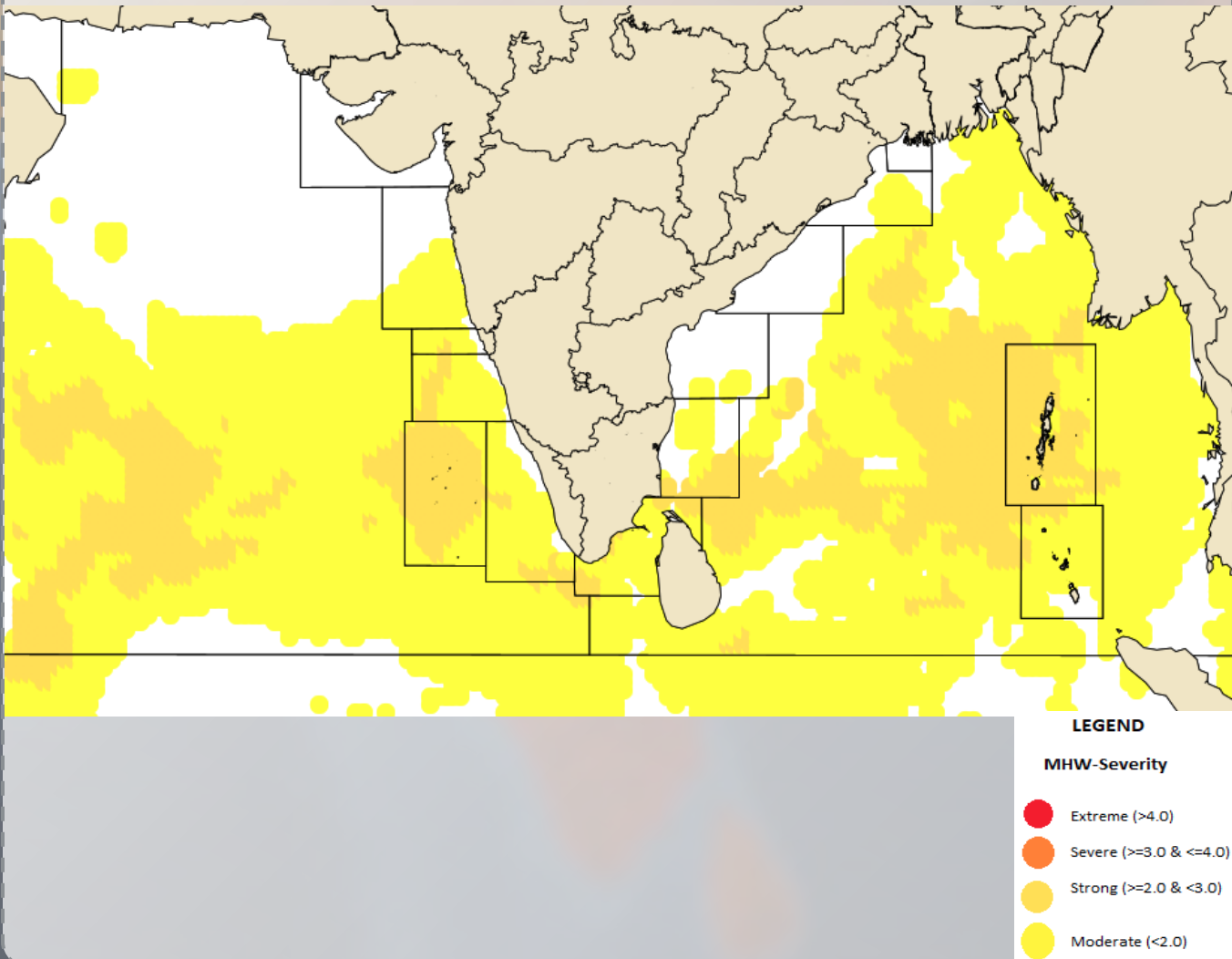
Marine heatwave area, INCOIS bulletin of 17 Sep 2026

Region	Watch	Alert	Warning
Arabian Sea	20%	21%	8%
Bay of Bengal	32%	11%	0%

COASTAL HOTSPOTS, 25 AUG

Andaman coast ~100% under moderate-to-extreme heatwave · Lakshadweep 75% · Nicobar 66%

Marine Heat Wave Advisory



Source: INCOIS Marine Heatwave Advisory Services (MAHAS). Update to the latest bulletin before presenting.

The Indian Ocean's risk peaks after the Pacific's

SEP 2026

Now

Heatwaves in both basins; September monsoon rain forecast below normal

NOV 2026 – JAN 2027

Pacific peak

El Niño expected at maximum strength

MAR – MAY 2027

Indian Ocean risk peak

Highest thermal stress on Arabian Sea and Bay of Bengal ecosystems

TO APR – MAY 2027

Warm ocean persists

Indian Ocean SST expected to stay above normal



The IOD is the wildcard. It is neutral now. IMD's Monsoon Mission model keeps it neutral, while some international centres expect a positive IOD, which would warm the west and cool the east.

Sources: INCOIS Special El Niño Bulletin (June 2026); IMD outlooks and extended range forecasts (Aug–Sep 2026)

CONSEQUENCES

Coral reefs, fisheries, aquaculture and
the livelihoods that depend on them



Coral reefs: stress now, the real test next spring

Reefs at risk

- Lakshadweep
- Andaman & Nicobar
- Gulf of Mannar
- Gulf of Kachchh
- Regionally: Maldives, Sri Lanka

Past bleaching years

1998

2010

2016

Each followed a Pacific El Niño

This year so far

A June 2026 survey in the Gulf of Mannar and Palk Bay found limited bleaching, no coral mortality, and early signs of recovery.



Watch window: March–May 2027. That is when bleaching alerts matter most.

Sources: INCOIS Special El Niño Bulletin (June 2026); The New Indian Express, 30 June 2026

Fisheries and aquaculture: fewer fish, new grounds

Capture fisheries

- Sardine and mackerel catches likely to fall as stocks move to cooler habitat
- Fishing grounds shift, so fishing-zone and tuna advisories relocate
- Precedent: the oil sardine decline on the Kerala coast after 2015–16

Aquaculture

- Heat stress and low dissolved oxygen in ponds and sea cages
- Higher risk of disease and harmful algal blooms
- Higher estuarine salinity if monsoon runoff is weak

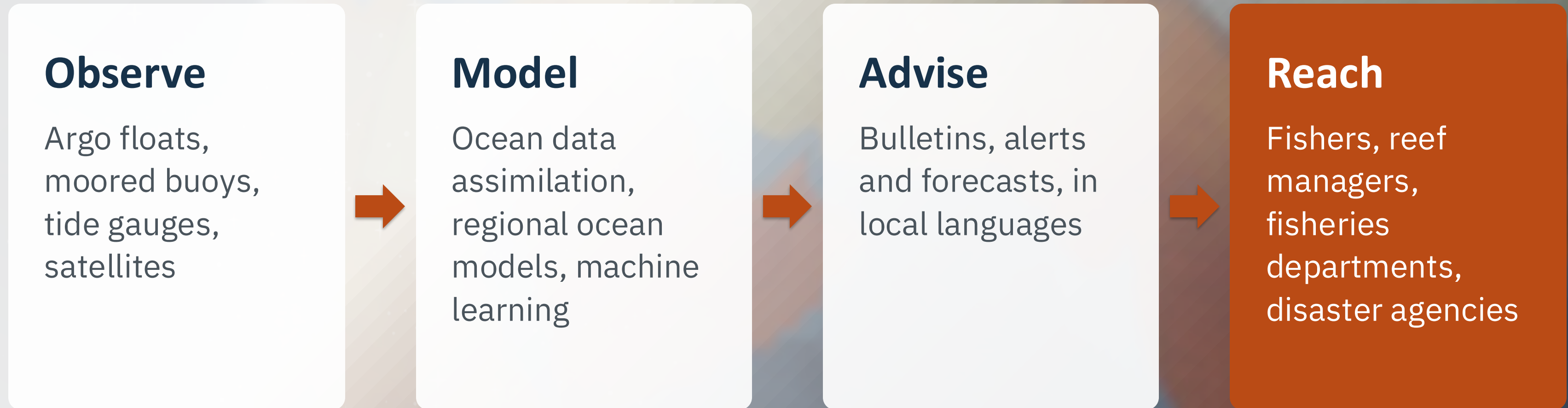
Sources: INCOIS Special El Niño Bulletin (June 2026); aquaculture risks from general literature

RESPONSE AND REGIONAL VALUE

INCOIS advisories, reaching communities, and what could help services across the region



From observation to advisory



The same ocean analyses also feed India's seasonal forecasts, which is how a Pacific outlook becomes an Indian Ocean advisory.

What INCOIS is issuing for this El Niño

NEW • JUNE 2026

Special El Niño Bulletin

Turns the Pacific outlook into Indian Ocean impacts for maritime sectors

Marine Heatwave Advisory (MAHAS)

Watch / Alert / Warning at 0–0.5, 0.5–1 and above 1 °C over the 90th percentile

Coral Bleaching Alert System

Accumulated heat-stress alerts for reef managers

Fishing-zone and tuna advisories

Potential Fishing Zone guidance from satellite SST and chlorophyll

Hilsa and algal bloom services

Hilsa Fishery Advisory (HiFA); Algal Bloom Information Service

Ocean State Forecast

High wave and swell surge alerts for safety at sea and on the coast

Source: INCOIS services and bulletins, 2026

Reaching the boat, not just the harbour



Mobile app and SMS, in local languages



Digital display boards at fishing harbours



Satellite messaging devices for boats beyond mobile range



Radio, TV and WhatsApp groups



Fisheries departments, NGOs and village knowledge centres

THE LESSON

The last mile runs through trusted local intermediaries, not just technology.

What could help other national services

Products that transfer

- Heatwave Watch / Alert / Warning built on freely available satellite SST
- ENSO outlooks rewritten as sector bulletins

Mechanisms in place

- Ocean forecasts shared with member countries via RIMES
- Regional Tsunami Service Provider
- Training at ITCOcean, Hyderabad

Proposals for the season

- Shared heatwave and bleaching monitoring
- Joint briefing before March 2027
- Feedback from reef managers and fisher groups

Take-home

The Pacific peaks this winter.

The Indian Ocean's risk season is next spring.

We have the lead time. The question is whether the information reaches the boat and the reef manager in time.



THANK YOU

FOR YOUR ATTENTION