OSF

JOINT INCOIS-IMD BULLETINS

Dr.R.Harikumar
Scientist & In-charge, OSF services

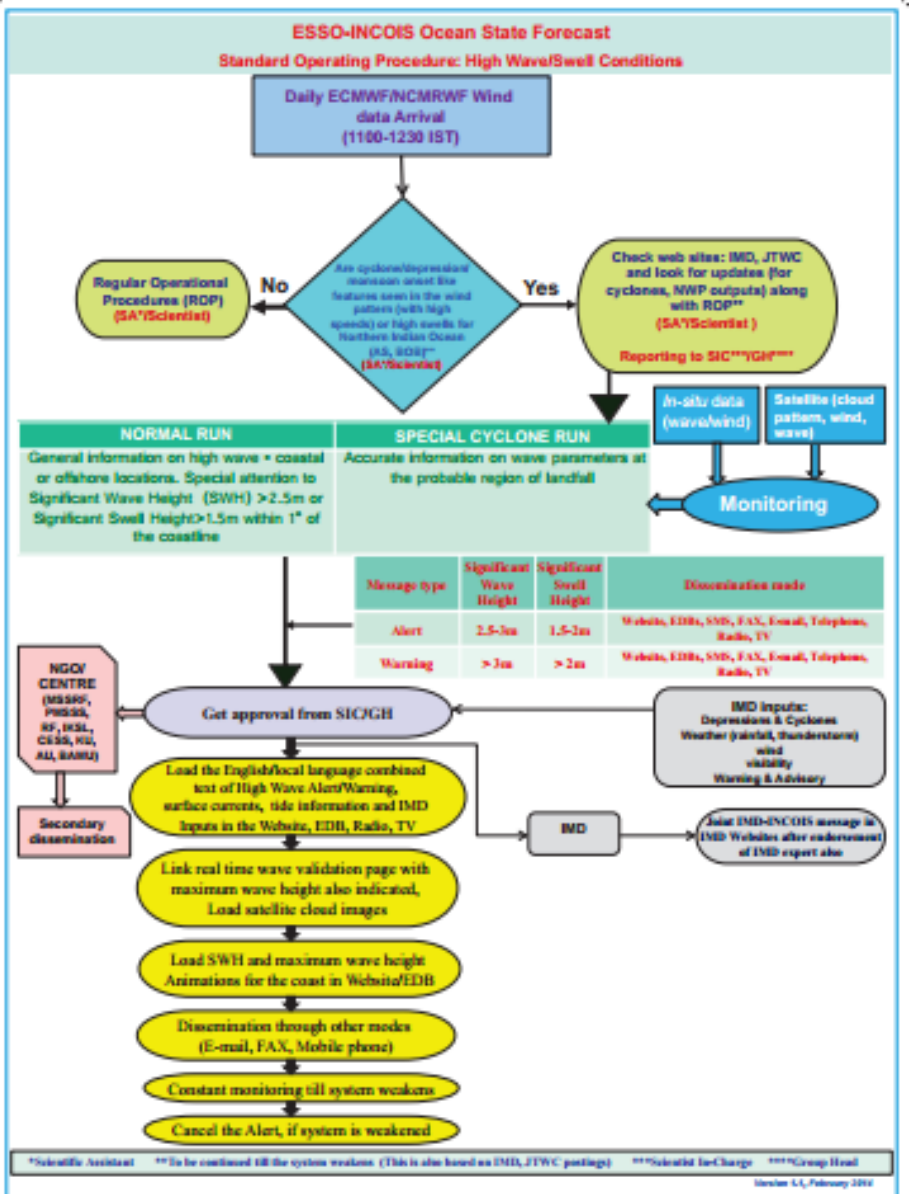
Training on OSF services for trainers and operators, 26-27 November 2014

Framing SOP and the present Status

- First OSF/INCOIS IMD meeting on 19th August 2013
- After that the plan was stream-lined.
- Made draft action plan.
- Prepared the draft SOP.
- Another OSF/INCOIS IMD meeting on 3rd April 2014.
- Discussed once again, and comments were taken from IMD and INCOIS members.
- Revised the draft SOP.
- Once again INCOIS received some more comments from IMD officials.
- INCOIS prepared the replies to IMD members and incorporated the possible suggestions/comments in the document.
- INCOIS framed a draft SOP chart and started Joint High Wave Bulletins (alert and warnings), posting in websites February 2014 onwards.
- A national SOP Committee is formed, and INCOIS Director nominated INCOIS members on 23 May 2014.
- INCOIS started preparing and issuing Joint INCOIS-IMD bulletins on OSF October 2014 onwards, Hudhud onwards.
- Started with 2 bulletins a day, and now having 4 bulletins a day.

- In all stages parallel action items were done by INCOIS and IMD.

Joint INCOIS-IMD Bulletin during cyclones



INCOIS

FAX MESSAGE

FROM: ESSO-INDIAN NATIONAL CENTRE FOR OCEAN INFORMATION SERVICES
(Ministry of Earth Sciences, Government of India)
(FAX NO. +91-40-23892910)

To: Senior MET Officer, Western Naval Command, Indian Navy
Commandant, Coast Guard, NW Region
Reliance Foundation, Mumbai
MSSRF, Chennai
CCMB, Ratnagiri
Ports in Gujarat & Maharashtra
Chief Secretary, Government of Gujarat
Chief Nautical Officer, Gujarat Maritime Board
Shipping Corporation of India

Time of issue: 0900 hours IST Dated: 29.10.2014, Bulletin No.: INCOIS/29/10/2014/1

Sub: INCOIS-IMD Joint Bulletin - Ocean State Forecast associated with Very Severe Cyclonic Storm 'NILOFAR' over westcentral Arabian Sea.

Cyclone Alert for north Gujarat coast

The very severe cyclonic storm, 'NILOFAR' over westcentral Arabian Sea moved nearly northward in past 12 hours, and lay centred at 0530 hours IST of today, the 29th October, 2014 near latitude 18.20 N and longitude 62.00 E, about 900 km southwest of Naliya (Gujarat), 910 km southwest of Karachi (Pakistan) and 420 km southeast of Masirah (Oman). It would move north-northeastwards during next 12 hours and then northeastwards and cross north Gujarat and adjoining Pakistan coast around Naliya by 01st November forenoon. However, as the system would come closer to Gujarat coast, it would weaken and cross the coast as a cyclonic storm.

(COASTAL GUJARAT)

Ocean State Forecast for 29 Oct 2014: for Gujarat coast

Waves in the range of 1.6 – 2.1 meters are forecasted during 11:30 hours on 29-10-2014 to 23:30 hours of 29-10-2014 along the coast of Gujarat between Kachchh to Amreli. Current speeds vary between 0.1-0.5 m/sec.

Ocean State Forecast for 30 Oct 2014: for Gujarat coast

Waves in the range of 1.6 – 2.2 meters are forecasted during 02:30 hours on 30-10-2014 to 23:30 hours of 30-10-2014 along the coast of Gujarat between Kachchh to Amreli. Current speeds vary between 0.1-0.4 m/sec.

Parameters/contents

- Cyclone/depression/low details

Forecast on (for probable land fall location on landfall day)

- Wave height & direction (**also specify whether high wave alert/warning! and full information**)
- Current speed & direction

- Wind speed & direction
- Rainfall details
- Storm surge details

- Advise/action suggested

INCOIS
INCOIS-ASG
IMD

During Hudhud (clarity on landfall location)

District	Maximum Significant Wave Height (m)	Current speeds (cm/s)
Andhra Pradesh		
West Godavari	2.5	100
East Godavari	3.0	120
Visakhapatnam	5.0	140
Vizianagram	5.5	145
Srikakulam	6.0	150
Odisha		
Ganjam	5.0	160
Puri	5.0	160
Jagatsinghpur	4.0	150

Storm surge warning: Storm surge of about 1-2 meters above astronomical tide would inundate low lying areas of east Godavari, Visakhapatnam, Vijayanagaram and Srikakulam districts of north coastal Andhra Pradesh at the time of landfall.

Wind warning: Squally wind speed reaching 50-60 kmph gusting to 70 kmph would commence along and off north Andhra Pradesh and south Odisha coasts from 11th morning onwards. The wind speed would increase to 130-140 kmph gusting to 155 kmph from 12th morning along and off north Andhra coast and 80-90 kmph along and off south Odisha coast.

Action suggested: Suspension of fishing operations in area of influence of cyclone. Fishermen already out at sea are advised to return to coast immediately. People in affected areas to remain at safe places around landfall period.

During Nilofar (no clarity on landfall location)

High Wave/ Ocean State Warning for 30 Oct 2014: for Gujarat coast

Waves in the range of 2.0 – 4.5 meters are forecasted during 02:30 hours on 30-10-2014 to 23:30 hours of 30-10-2014 along the coast of Gujarat between Kachchh to Amreli. Current speeds vary between 0.8-1.3 m/sec.

The maximum Significant Wave Height and maximum surface current speeds forecasted for the sea off each district (within 100 km from the shore) for the coming three days of Gujarat state are presented below:

	28 October 2014		29 October 2014		30 October 2014	
District	Maximum Significant Wave Height (m)	Maximum surface Current speeds (m/s)	Maximum Significant Wave Height (m)	Maximum surface Current speeds (m/s)	Maximum Significant Wave Height (m)	Maximum surface Current speeds (m/s)
Kachchh	1.5	0.1	1.6	0.1	4.5	1.3
Dwarka	2.9	0.3	2.8	0.3	4.2	1.1
Porbandar	2.7	0.2	2.8	0.2	3.0	1.0
Junagadh	2.6	0.3	2.6	0.3	4.0	1.1
Somnath	2.4	0.3	2.4	0.3	3.0	1.0
Amreli	1.8	0.3	1.9	0.4	2.3	0.9
Bhavnagar	0.9	0.2	0.8	0.2	2.0	0.8

Warnings: Under the influence of this system, rainfall at most places with isolated heavy to very heavy falls would commence along coastal districts of Saurashtra and Kutch from 30th October morning. Intensity would increase gradually with heavy to very heavy fall at a few places from 30th October night. Squally winds speed reaching 45-55 kmph gusting to 65 kmph would commence along and off Gujarat coast from 30th October morning and would become 100-110 kmph gusting to 125 kmph at the time of landfall.

Action suggested: Fishermen out at sea along and off Gujarat coast should return to the coast. Total suspension of fishing operations. Coastal hutment dwellers to be moved to safer places. People in affected areas to remain indoors around landfall time.

Marine Forecaster
Ocean State Forecast Team
Information Services and Ocean Sciences Group

For Specific Ocean State forecast for Shipping visit http://115.113.76.77/shipforecast/shipforecast.html
Port and Harbours visit (http://115.113.76.77/OSF).
For location specific forecast data for any part of Bay of Bengal visit
(http://115.113.76.77/webmapservice/Indian_Ocean_Forecast.html)
For complete details visit (http://www.incois.gov.in/portal/osf/osf.jsp#).

During Depression (Nov first week) – just weakened

Ocean State Forecast for Andaman

High waves in the range of 3.0 - 4.2 meters are forecasted during 11:30 hours on 07-11-2014 to 23:30 hours of 08-11-2014 along the west coast of Andaman Islands between Ten Degree Channel to Coco Channel.
 Current speeds vary between 94 - 108 cm/sec.

Ocean State Forecast for Nicobar

High waves in the range of 2.5 - 2.9 meters are forecasted during 11:30 hours on 07-11-2014 to 23:30 hours of 07-11-2014 along the west coast of Nicobar Islands between Ten Degree Channel to Great Channel.
 Current speeds vary between 76 - 109 cm/sec.

Warnings

Rainfall warning: Moderate rainfall would occur at many places over districts of Andhra Pradesh on 8th & 9th November, 2014.

Wind warning: Squally wind speed reaching 35-45 kmph gusting to 55 kmph would prevail along and off Andhra Pradesh and north Tamilnadu coast on 8th and 9th Nov. 2014.

Sea condition: Sea condition could be rough to very rough along and off Andhra Pradesh and north Tamilnadu coast on 8th and 9th Nov. 2014.

Fishermen warning: Fishermen are advised not to venture into sea along and off Andhra Pradesh, and North Tamilnadu coast on 8th and 9th Nov. 2014. Fishermen out at sea along and off these coasts are advised to return to the coast.

Marine Forecaster
Ocean State Forecast Team
Information Services and Ocean Sciences Group

For Specific Ocean State forecast for Shipping visit http://115.113.76.77/shipforecast/shipforecast.html
Port and Harbours visit (http://115.113.76.77/OSF).
For location specific forecast data for any part of Bay of Bengal visit
(http://115.113.76.77/webmapservice/Indian_Ocean_Forecast.html)
For complete details visit (http://www.incois.gov.in/portal/osf/osf.jsp)

Refining the forcing fields based on Weather bulletins and real-time Observations

1

2

INCOIS REAL-TIME AUTOMATIC WEATHER STATIONS (I-RAWS)

3

Time of issue: 1500 hours IST

Bulletin No.:

Sub: Very Severe Cyclonic Storm 'PHAILIN'
Bengal: Cyclone Warning for North Ar

The very severe cyclonic storm, **PHAIL**
Bengal moved north-northwestwards during pas
at 1430 hrs IST of today, the 12th October 201
Bengal near latitude 18.6^0 N and longitude 85.4
move northwestwards and cross north Andhra
(Odisha) during 6-8 P.M. of today i.e. the 12th Oc
maximum sustained wind speed of 210-220 kmp

Estimated track and intensity of the system ar

Date/Time(IST)	Position (Lat. ^{0}N/ Long. ^{0}E)	Sustained wind
12-10-2013/1430	18.6/85.4	210-22
12-10-2013/1730	19.2/84.9	210-22
12-10-2013/2330	20.2/84.3	170-18
13-10-2013/0530	21.2/84.0	80-90
13-10-2013/1130	22.0/83.5	50-6

WTIO31 PGTW 090300

WRNCEN PEARL HARBOR HI//
OI) WARNING NR 013//

) WARNING NR 013
IN NORTHIO
ON ONE-MINUTE AVERAGE
WATER ONLY

SE
- 360 DEGREES AT 03 KTS
HIN 040 NM
LOCATED BY SATELLITE

KT, GUSTS 080 KT
WATER ONLY
85 NM NORTHEAST QUADRANT
85 NM SOUTHEAST QUADRANT
85 NM SOUTHWEST QUADRANT
85 NM NORTHWEST QUADRANT
90 NM NORTHEAST QUADRANT
90 NM SOUTHEAST QUADRANT
90 NM SOUTHWEST QUADRANT
90 NM NORTHWEST QUADRANT

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90 NM SOUTHEAST QUADRANT
90 NM SOUTHWEST QUADRANT
90 NM NORTHWEST QUADRANT
DEG/ 01 KTS

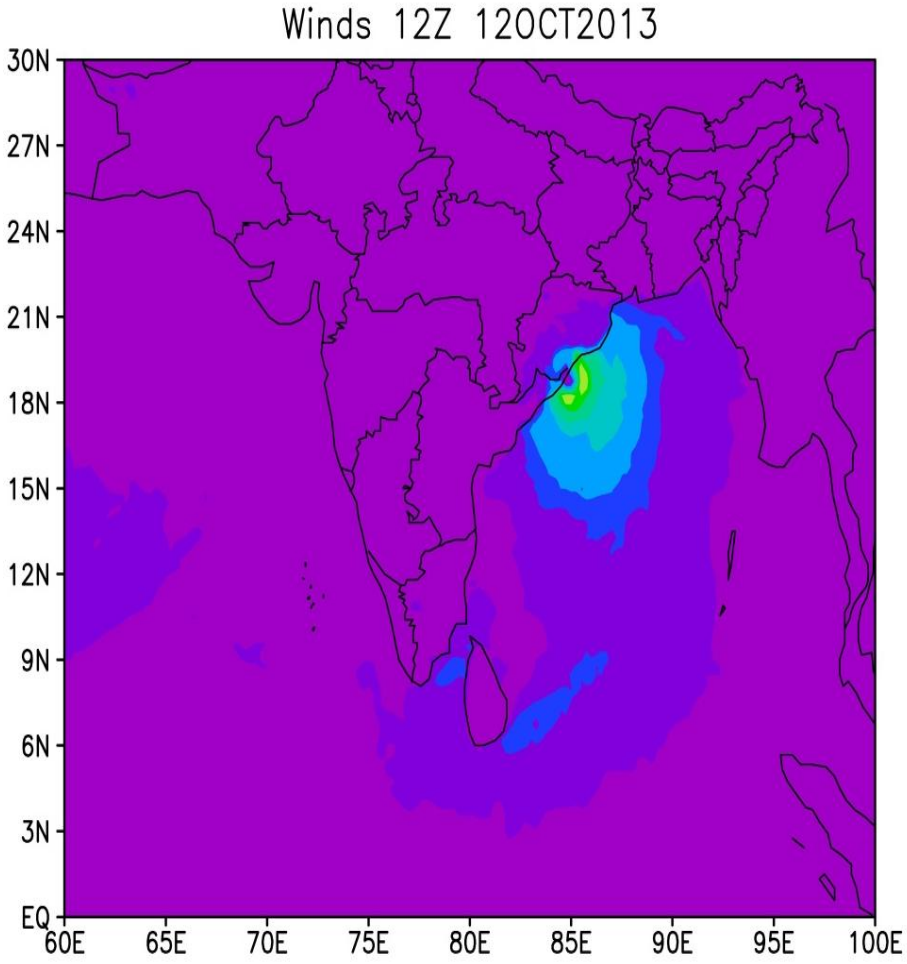
KT, GUSTS 075 KT

IMD bulletin

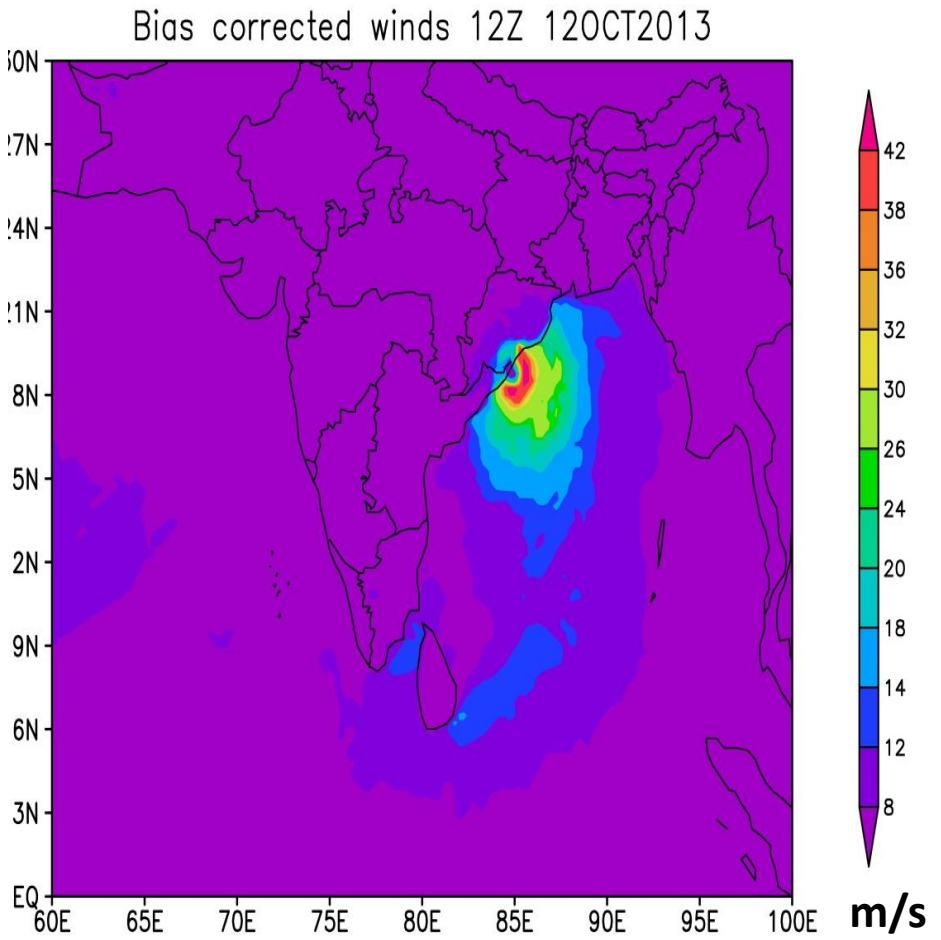
JTWC bulletin

Bias correction/Uncertainty removal

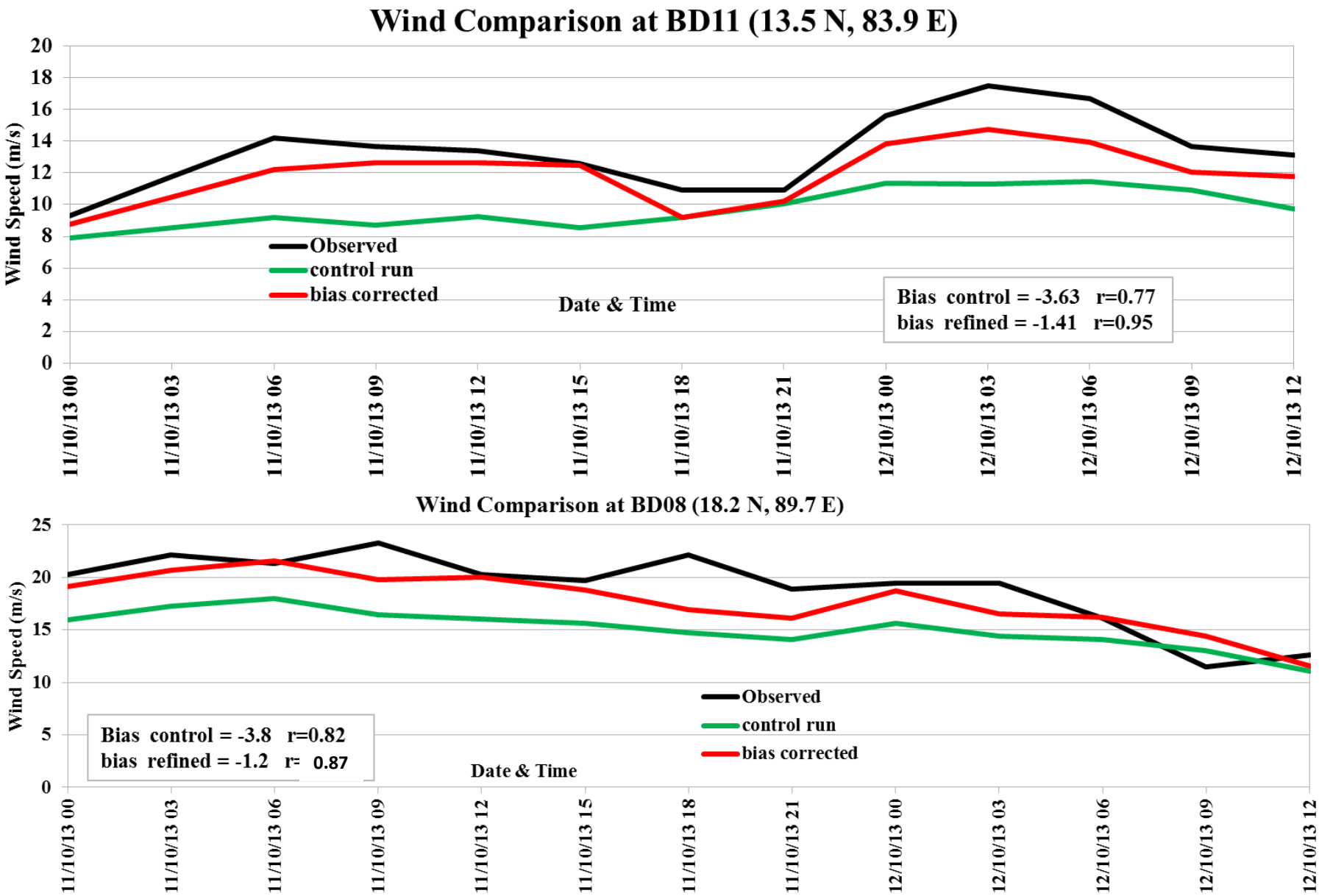
Before



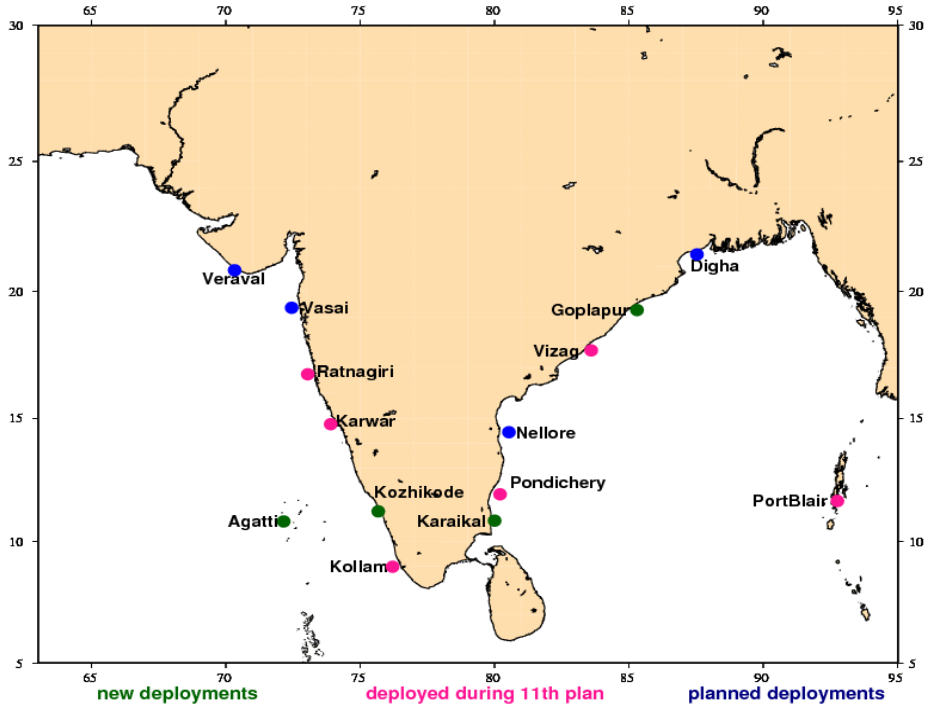
After

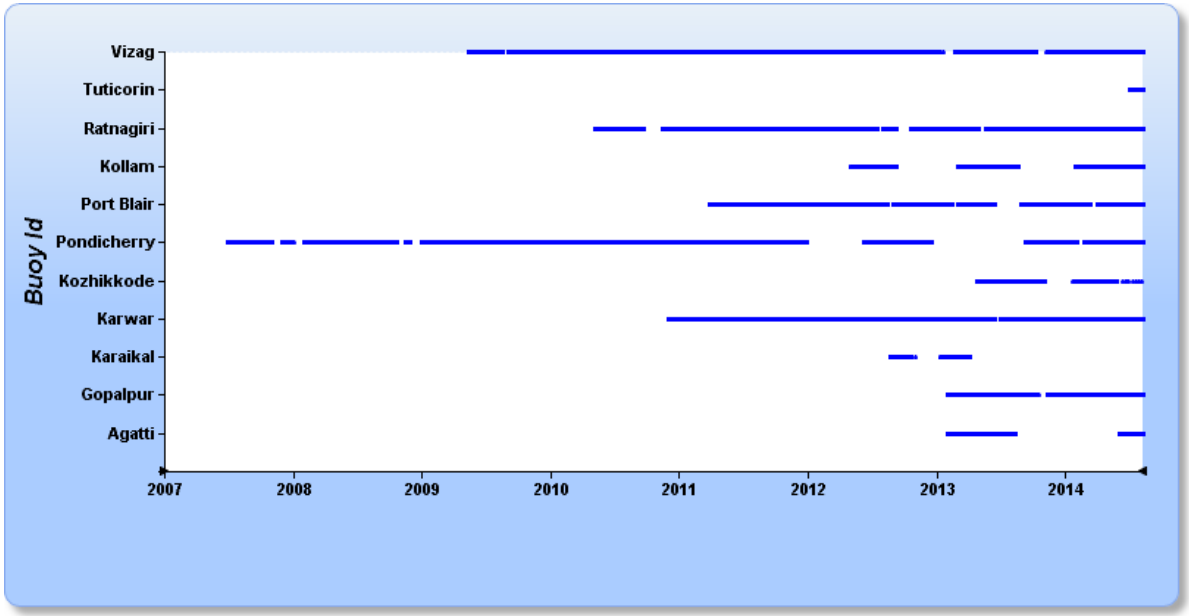


Validation using NIOT buoys



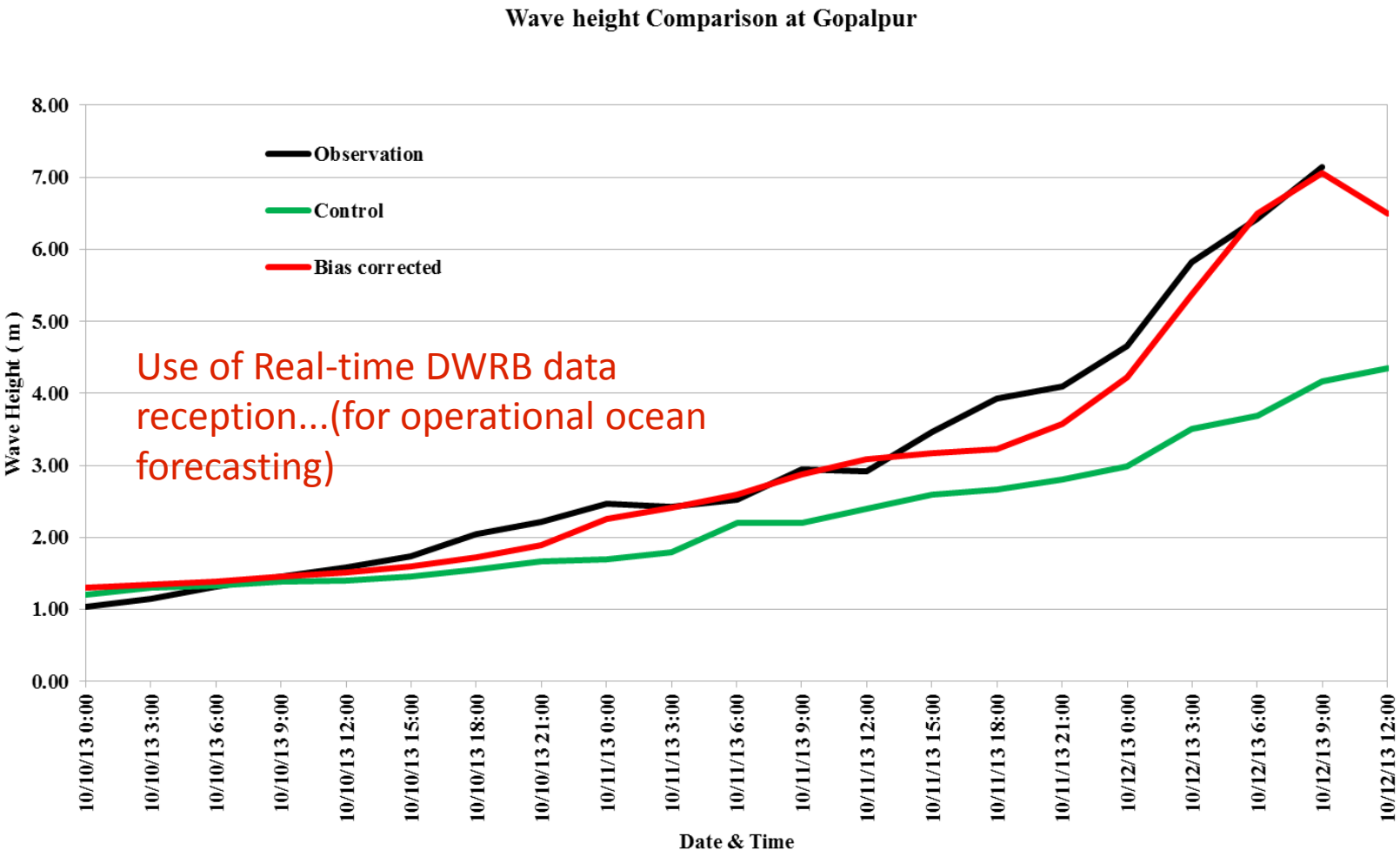
Wave Rider Buoys





WE COULD DELIVER A "BETTER" WAVE FORECAST LIKE THIS…

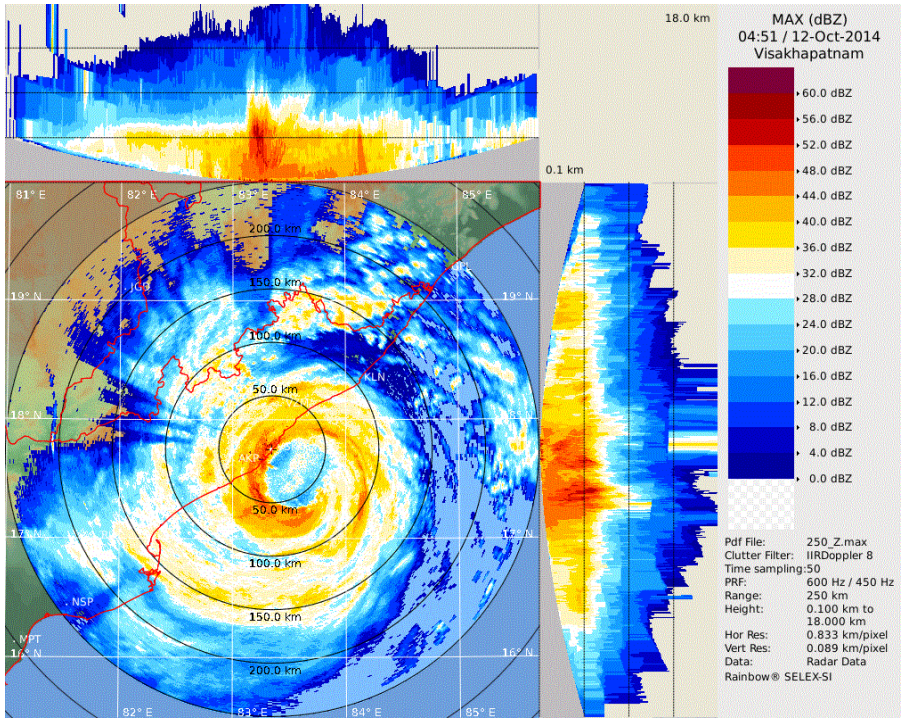
Wave Rider Buoy at Gopalpur (19.3N, 84.96E), Odisha

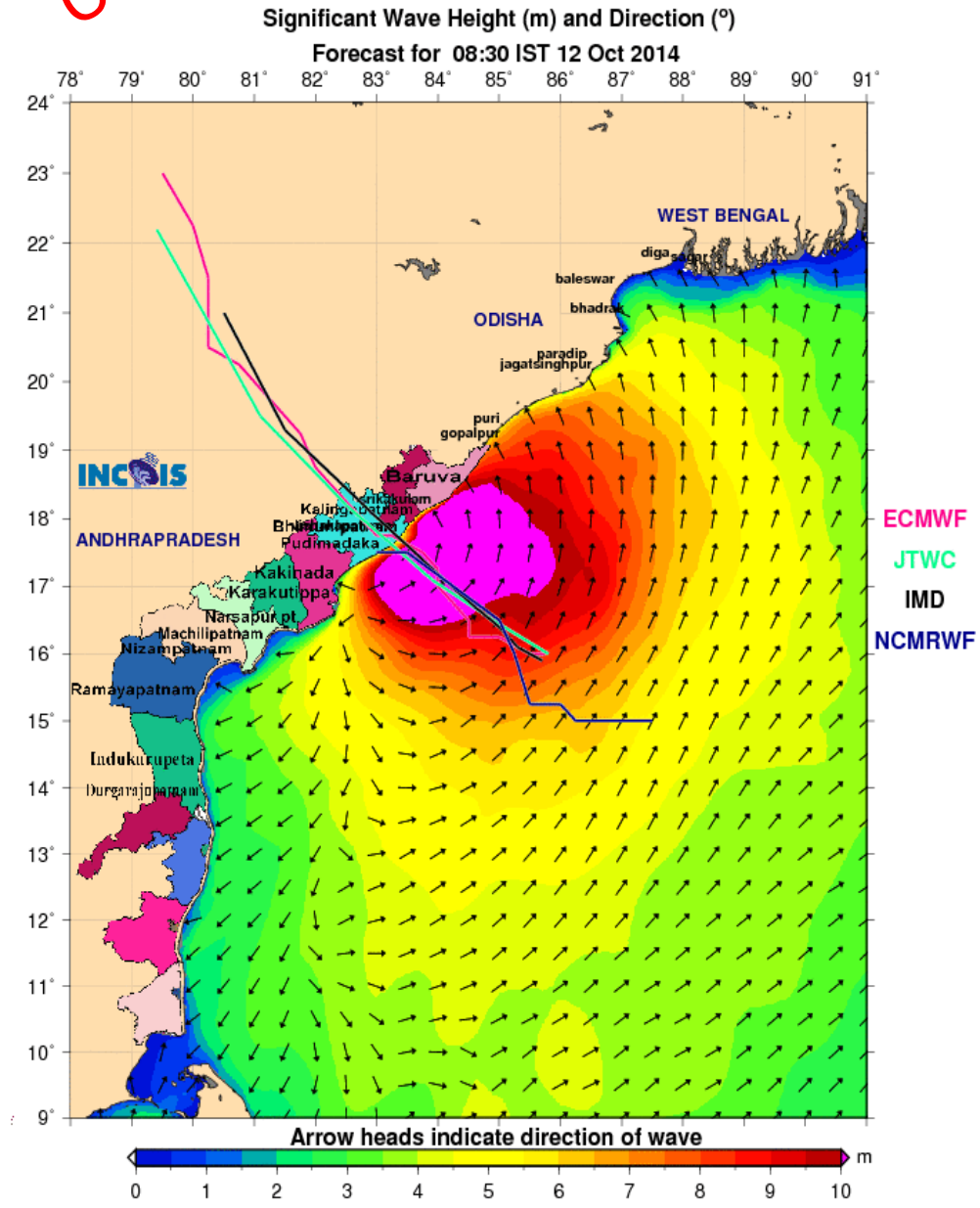


OSF during...

Cyclone Hudhud
October 2014

Last DWR observation



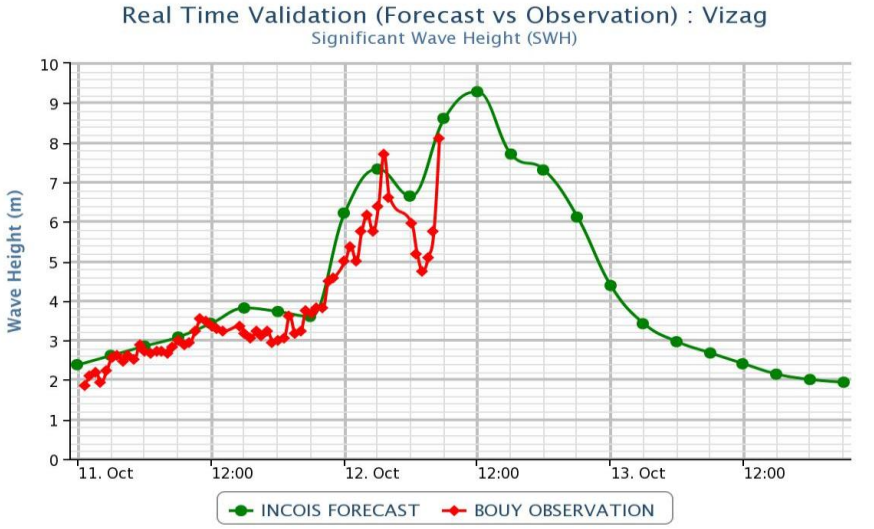


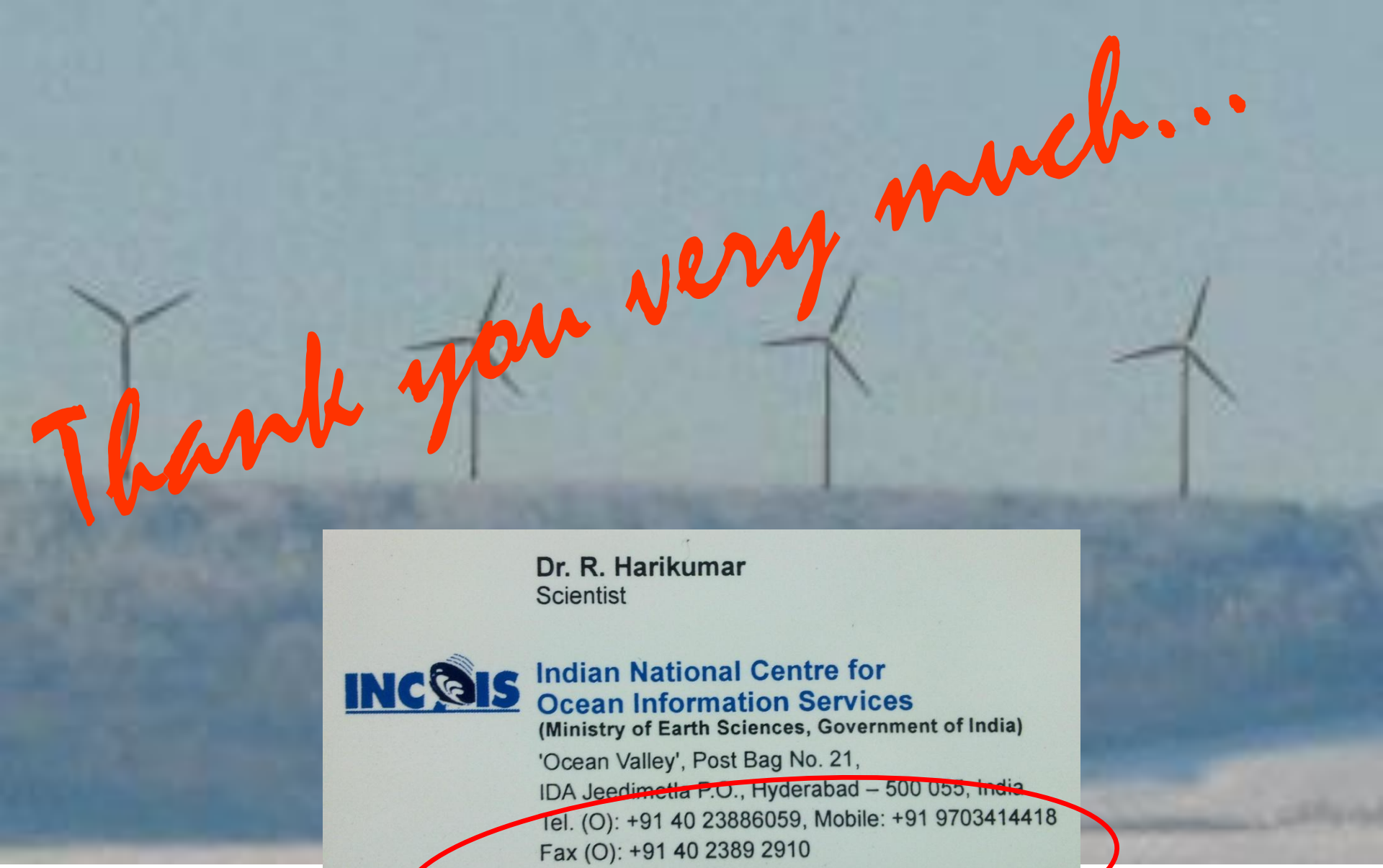
ECMWF

JTWC

IMD

NCMRWF





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