169 New names of cyclones over the north Indian Ocean were introduced beginning with cyclone, Nisarga in June 2020.

Accurate forecasting for two major cyclones of 2020 by IMD:

**Super Cyclone AMPHAN** (during 16-21 May, 2020), as predicted crossed West Bengal coast over Sundarbans during 1530-1730 IST of 20th May 2020 with wind speed of 155-165 kmph gusting to 185 kmph.

**Severe Cyclonic Storm NISARGA** (during 01-04 June, 2020), as predicted crossed Maharashtra coast near Alibag during 1230-1430 IST of 3rd June 2020 with wind speed of 100-110 kmph gusting to 120 kmph.

**RECENT ACHIEVEMENTS**

- With the commissioning of three X-Band Doppler Weather Radars (XWR) at Sonmarg, Mukteshwar and Kufri, IMD’s DWR network expanded to 27 DWRs operational across the country.
- Multi-Mission Meteorological Data Receiving & Processing System for satellite meteorological applications established and dedicated to the nation.
- **SATELLITE BASED TOOLS**
  - Rapid for satellite cloud analysis
  - Microwave product for cloud classification
  - Lightning Intensity and amplitude
  - Dust storm
  - Thermals
  - INSB 3D
  - METEOSAT 4
  - Bullet-Wave

- 190 District Agrometeorological Field Units established.
- Meteorological Centre, Leh was established and inaugurated by Honble Minister of Earth Sciences.
- Revival of about 250 AWS/ARG/Agro-AWS Establishment of about 15 AWS in Kerala and about 60 ARG in Mumbai.
- Current Weather Instrument Systems installed at 32 airports and 12 systems supplied to IAF for installation in Myanmar.
- Three transmissometer (Drashi System) installed at Kochi, Thiruvananthapuram and Bhubaneswar thus totaling to 44.

- 203 new raingauge stations added in the District-wise Rainfall Monitoring Scheme taking the total number of stations to 4940.
- Preparation of real-time rainfall statistics enhanced to 690 districts.
- Observations from ground-based lightning networks of IITM & IAF brought within forecast framework of IMD.
**RECENT ACHIEVEMENTS**

**Numerical Modelling**
- Global Forecast System (GFS) model upgraded & run 4 times from 2 times a day to generate 10 days forecasts.
- Global Ensemble Forecast System model at 12 km generated forecast for 717 Districts and 6667 Blocks.
- Regional WRF mesoscale model upgraded from 9 km to 3 km resolution.
- Hurricane WRF was run as a coupled model at a resolution of 2 km in collaboration with INCOIS to generate six hourly forecasts.
- New numerical models, SILAM and ENFUSER made operational for Air Quality Early Warning System for Delhi during 2020.

**Forecasting & Applications Products**
- Focus was on forecast modeling for all types of severe weather including cyclone, heat wave, cold wave, fog, heavy rain, thunderstorm at 739 districts and 25 capital cities.
- Health guidance product based on Extended Range (up to Two Weeks) forecast for all meteorological subdivisions and districts.
- The tourism forecast is being provided in collaboration with Incredible India through integration of information in website and mobile app.
- Increase in issue of District level agrometeorological advisories from 563 to 668 districts in 2020 and Block level advisories to 2300 Blocks.

**Skill Scores Related to Heat Wave Warning**
- Skill Scores for 24 hr Thunderstorm forecast verification during last 5 years (2016 to 2020).

**Improvement in Forecast Accuracy**
- Significant improvement in forecast accuracy of severe weather events by 15 to 35% during last 5 years.
- All India SW Monsoon heavy rainfall (24 hrs) skill for 2020va-2021-2019 (left panel). There is also an increasing trend in POD of 24 hr heavy rainfall forecast.

**NWP METEOROGRAMS**
- New normal for onset and withdrawal dates of monsoon was introduced based on the latest data of 1961-2010.
- Climate of capital cities and smart cities prepared along with the trend analysis.
- Climatological Summaries published for 22 airports during the year 2020.
- Long range forecast of temperature and rainfall was issued for all the seasons under South Asia Climate Outlook Forum (SASCOF).
Dissemination

- IMD services on UMANG App inaugurated.
- Hindi version of the Mausam website developed and implemented.
- API for weather observed and forecast products of IMD has been developed and provided to different states, different central Government organizations including NITI Aayog, Tourism, DD News etc. About 10 states have implemented this API for their services.
- Mobile Apps MEGHDOOT and MAUSAM launched.

MEGHDOOT Mobile APP (Weather Information)

- IMD launched Weekly Weather Video capsule of current weather status and forecast for next two weeks. Video capsule is uploaded on Facebook and YouTube pages of IMD every Thursday in both English & Hindi. Similar videos are uploaded in some regional languages by IMD’s State Met. Centres.
- Common Alert Protocol (CAP) implemented as per WMO standard for severe weather warning. It is being utilized for Global Multi-hazard Alert System of WMO.
- Crowd Source Platform has been launched through website and mobile app for collecting the weather observations from people.

PLEASE VISIT

- IMD Apps: Mausam/ Meghdoot /DAMINI /RAIN ALARM
- Social Media: Facebook, Twitter, Instagram, BLOG
- FB: https://www.facebook.com/IndiaMeteorologicalDelegation
- Twitter: https://twitter.com/Indiametdept
- Blog: https://imdweather1875.wordpress.com/
- Instagram: https://www.instagram.com/mausam_nwfc
- Youtube: https://www.youtube.com/channel/UC_qxTReog07UVARm87CuvQw

SOUTHWEST MONSOON FORECAST 2020

Long range forecast of monsoon rainfall issued on 15th April, 2020 and was updated on 31st May 2020. The forecast for 2nd Half was issued on 31st July 2020.

<table>
<thead>
<tr>
<th>Region</th>
<th>Period</th>
<th>15th April</th>
<th>31st May</th>
<th>31st July</th>
</tr>
</thead>
<tbody>
<tr>
<td>All India</td>
<td>Jun to Sep</td>
<td>100± 5</td>
<td>102± 4</td>
<td>107 (1June-6 Sep)</td>
</tr>
<tr>
<td>All India</td>
<td>Aug to Sep</td>
<td>104± 8</td>
<td></td>
<td>127</td>
</tr>
</tbody>
</table>

Actual Rainfall (% of LPA) | 31st May | 31st July |
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<tr>
<th></th>
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</tr>
</tbody>
</table>

Extended Range Forecast (ERF)

- Meteorological subdivisions level Extended Range Forecast based on coupled models run at IMD operational on every Thursday.
- These forecasts for two weeks are used to issue ERFs at state levels.
- Performance for 2020 monsoon:

Operational Long Range Forecast Issued For the Southwest Monsoon Rainfall

In addition, forecast for date of Monsoon Onset over Kerala in May

POSITIONAL ASTRONOMY DATA SERVICES

YEAR-WISE EXPENDITURE ON CENTRAL SECTOR SCHEMES (ACROSS)