

201812 - Rainfall - Sri Lanka

Status: Finalised Material from: Linus

1. Impact

On 21 December extreme rainfall affected northern Sri Lanka, affecting more than 100000 people.

<https://reliefweb.int/disaster/fi-2018-000425-lka>

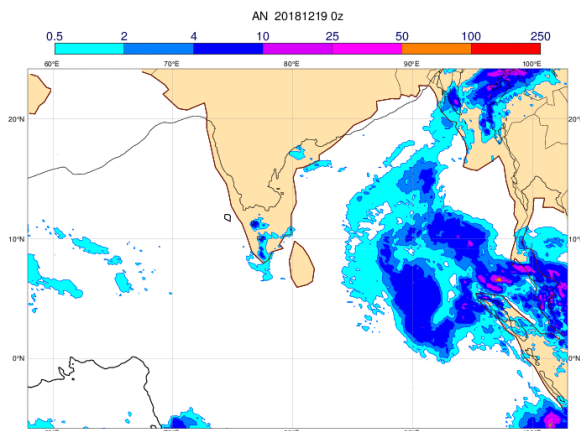
<http://floodlist.com/asia/sri-lanka-floods-december-2018>

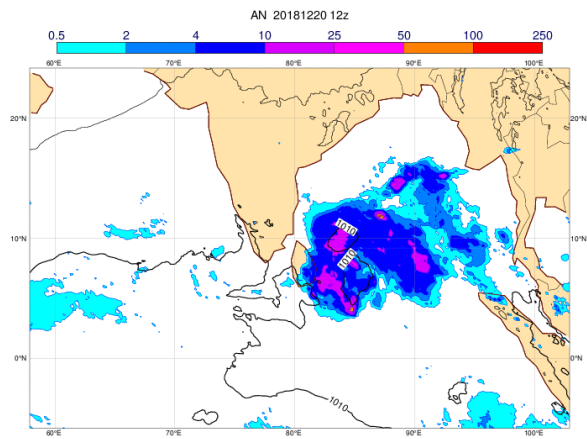
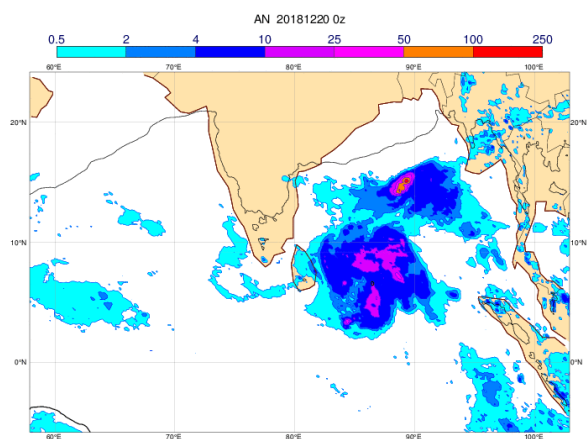
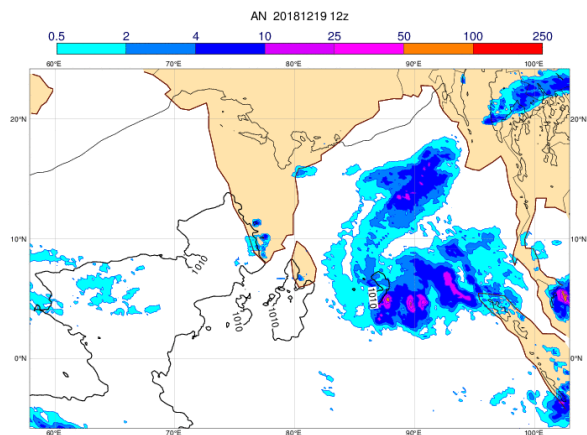
2. Description of the event

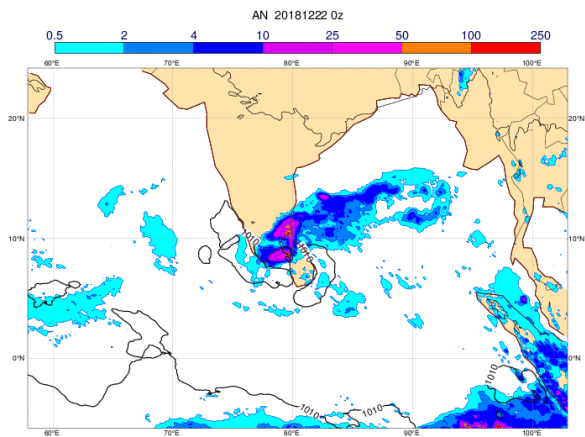
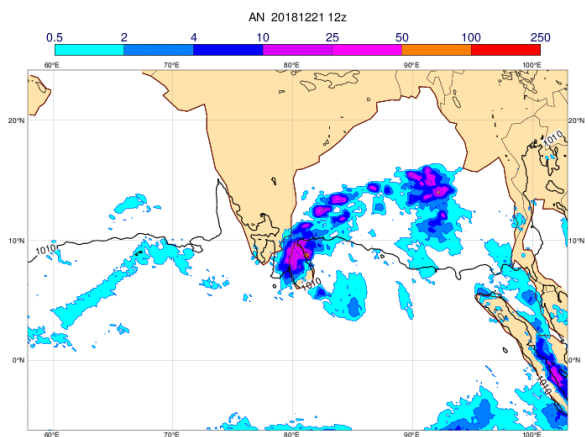
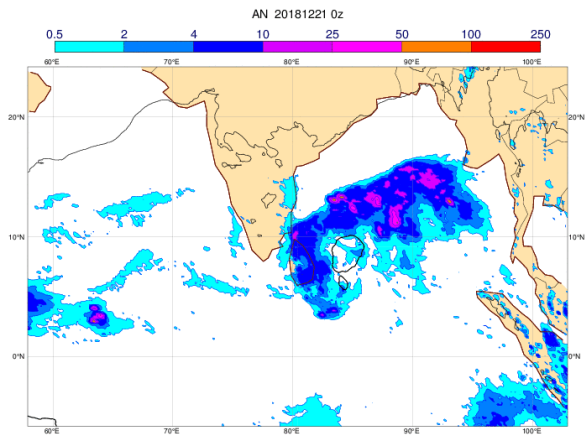
Rainfall observations (from <http://floodlist.com/asia/sri-lanka-floods-december-2018>, Figures from Sri Lanka's Department of Meteorology):

365.1 mm in 24 hours Maankulam, Mullaitivu district - December 21 to December 22, 2018
302.1 mm in 24 hours Oddusddan - December 21 to December 22, 2018
237.3 mm in 24 hours Kilinochchi - December 21 to December 22, 2018
220.2 mm in 24 hours Elephant Pass, Pachchilapalli, Sri Lanka - December 21 to December 22, 2018
201.2 mm in 24 hours Anuradhapura - December 21 to December 22, 2018

The plots below show analyses of MSLP and 6-hour precipitation forecasts ranging 19 December 00UTC to 22 December 00UTC. An area of precipitation propagated westwards over Indian Ocean during these days.





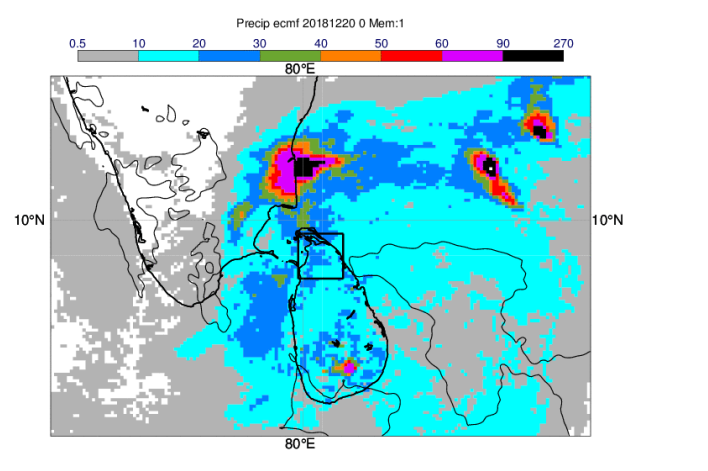
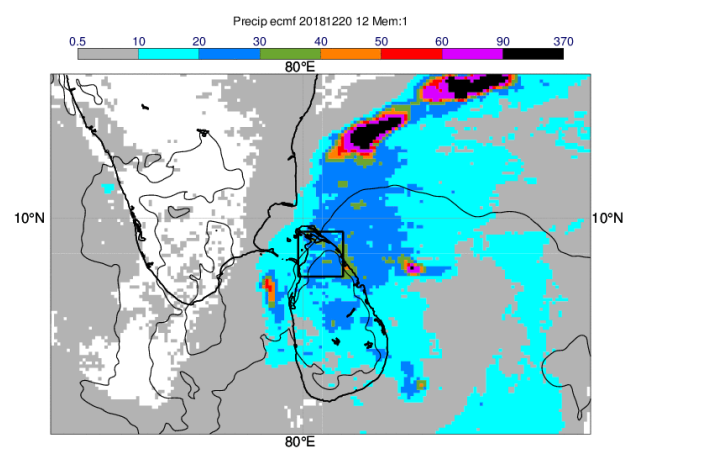
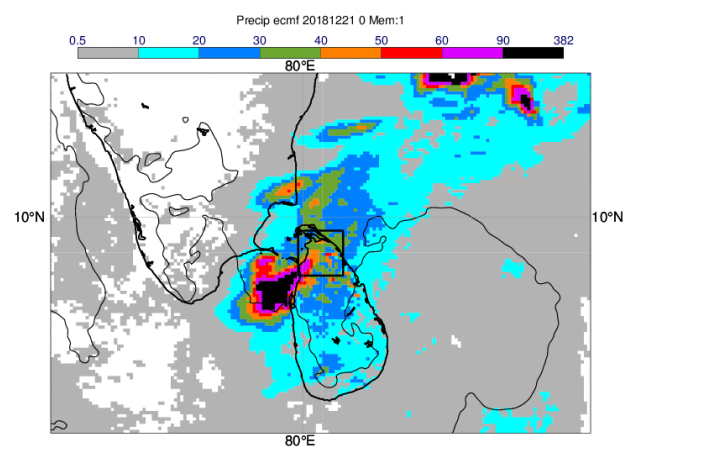


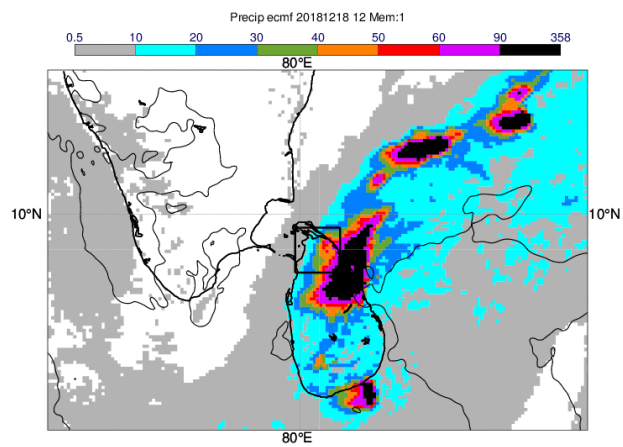
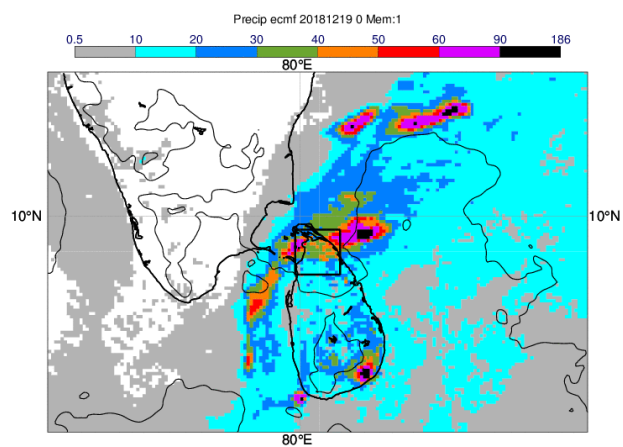
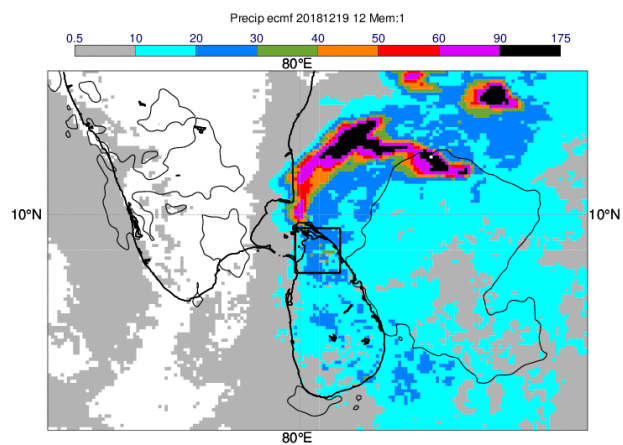
3. Predictability

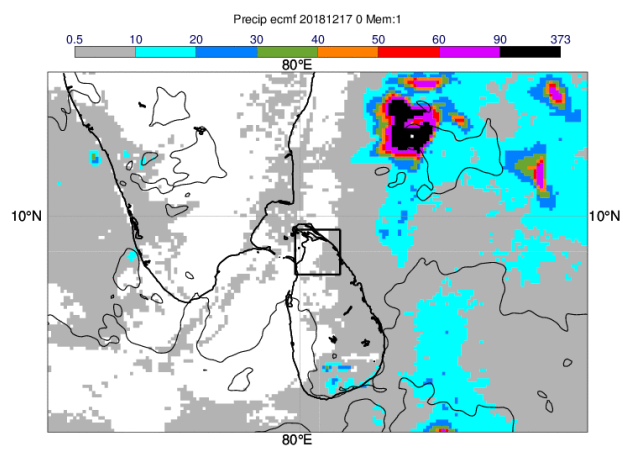
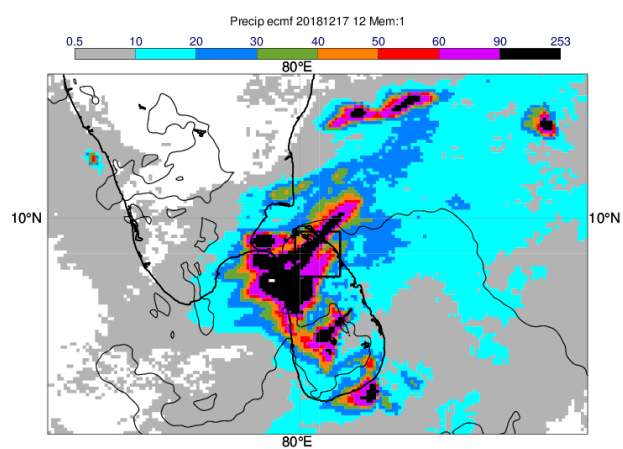
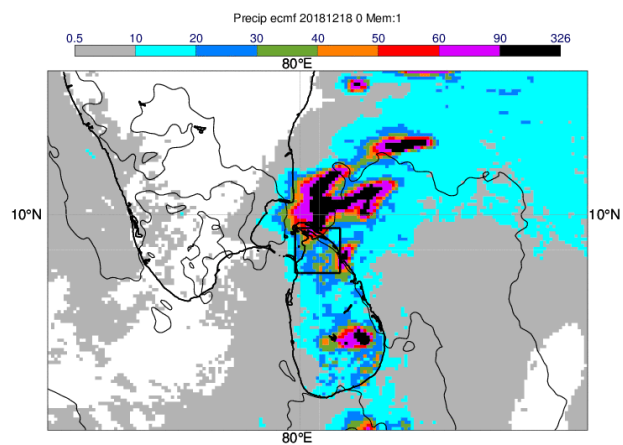
3.1 Data assimilation

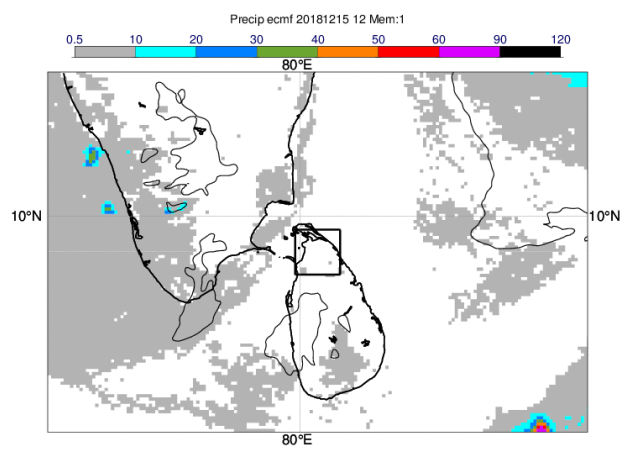
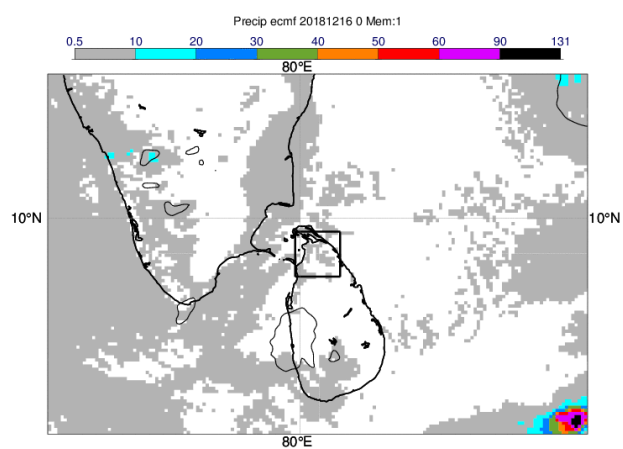
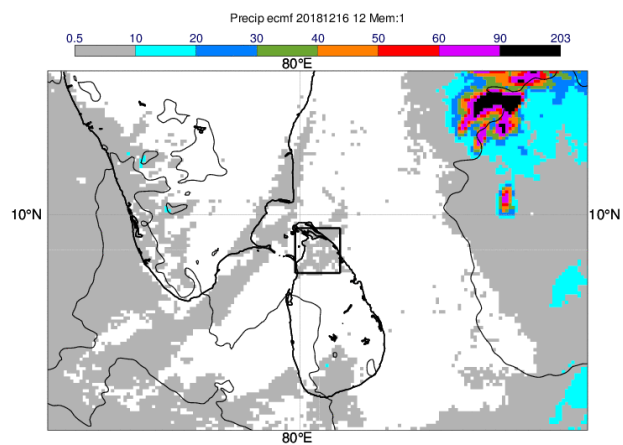
3.2 HRES

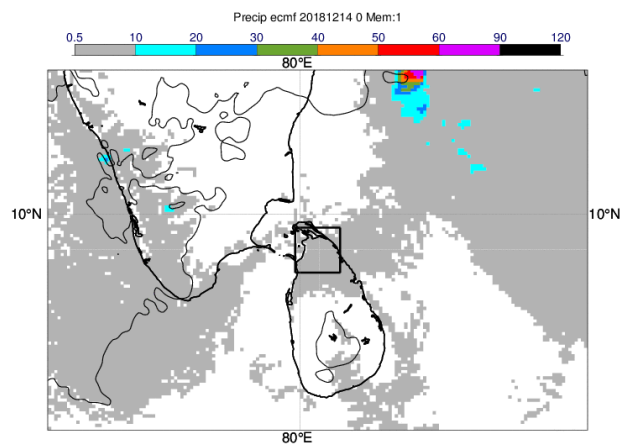
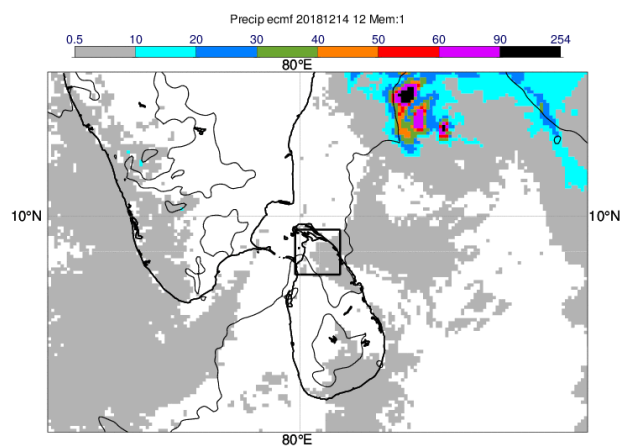
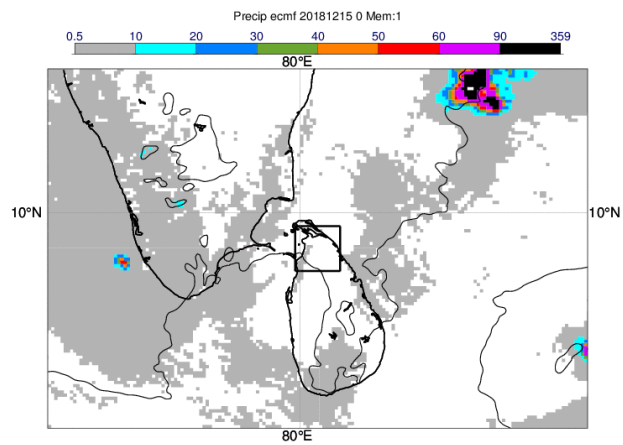
The plots below show 24-hour accumulated precipitation 21 December 00UTC to 22 October 00UTC in forecasts with different initial times. The MSLP valid at 21 December 12UTC is included as well. Moderate rainfall (20-30 mm/24h) with possibilities of extreme rainfall was indicated in HRES forecasts from 17 December 12UTC and onwards.

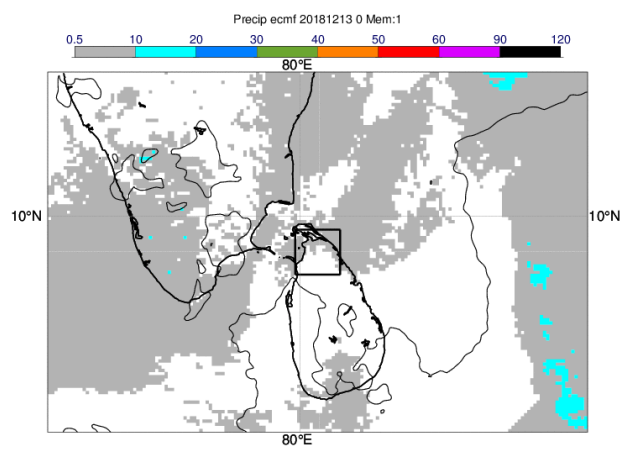
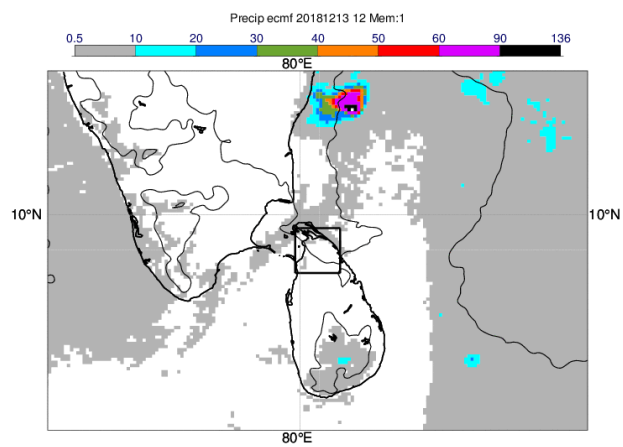


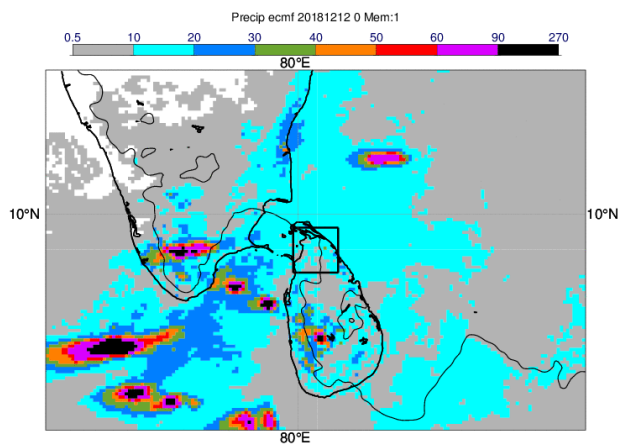
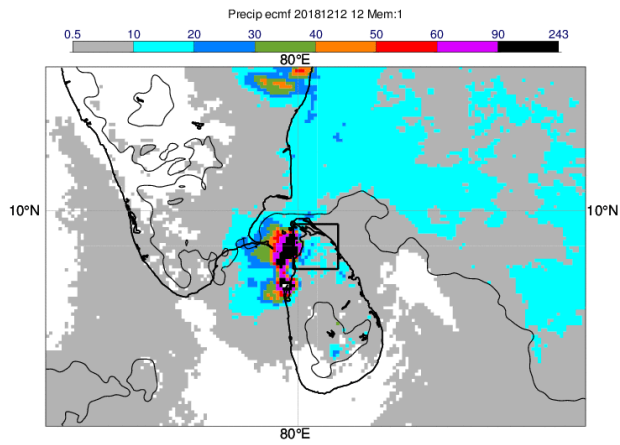






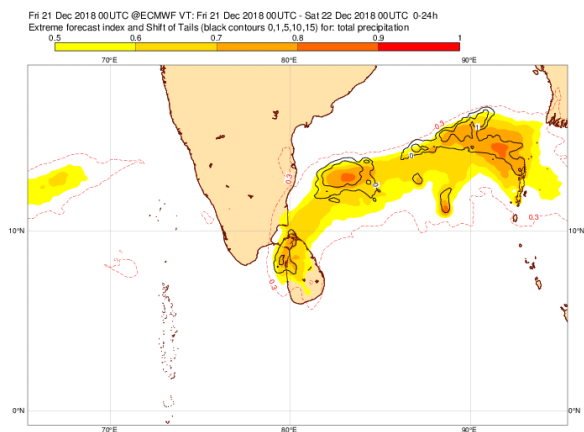




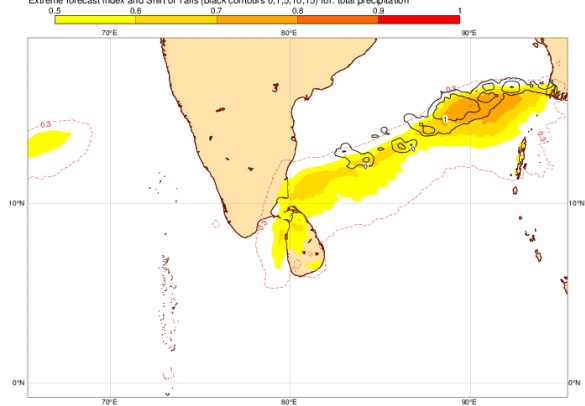


3.3 ENS

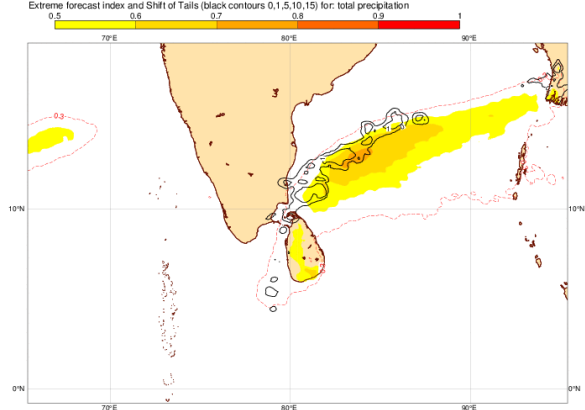
The plots below show the EFI and SOT for 1-day precipitation valid 21 December. High SOT values start to appear in the forecast from 18 December north of Sri Lanka, indicating that some members have extreme rainfall.



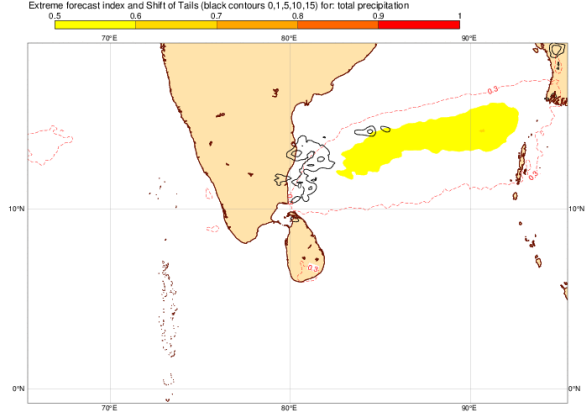
Thu 20 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 24-48h
Extreme forecast index and Shift of Tails (black contours 0.1, 5, 10, 15) for: total precipitation



Wed 19 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 48-72h
Extreme forecast index and Shift of Tails (black contours 0.1, 5, 10, 15) for: total precipitation

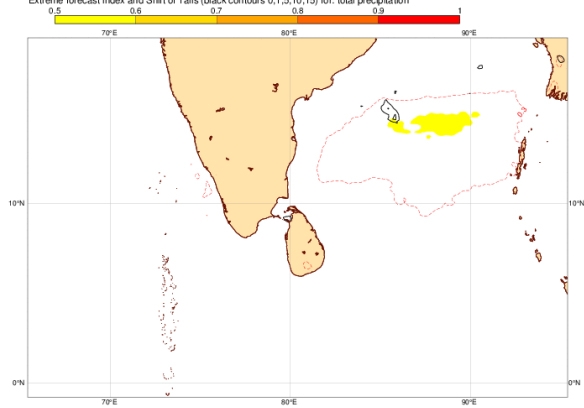


Tue 18 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 72-96h
Extreme forecast index and Shift of Tails (black contours 0.1, 5, 10, 15) for: total precipitation



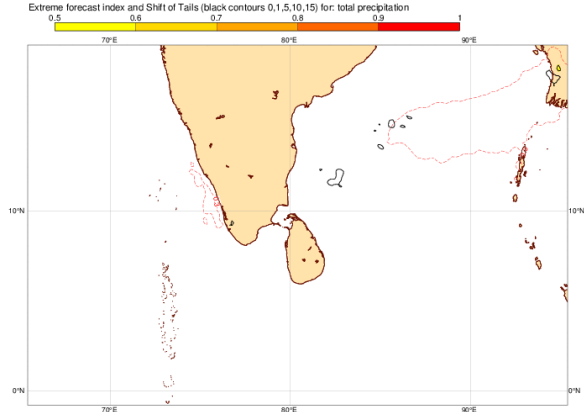
Mon 17 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 96-120h

Extreme forecast index and Shift of Tails (black contours 0,1,5,10,15) for: total precipitation



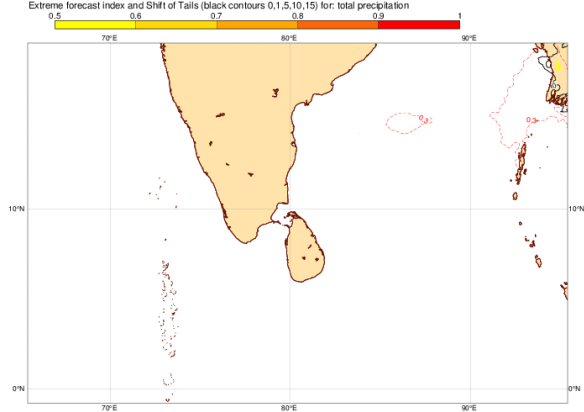
Sun 16 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 120-144h

Extreme forecast index and Shift of Tails (black contours 0,1,5,10,15) for: total precipitation



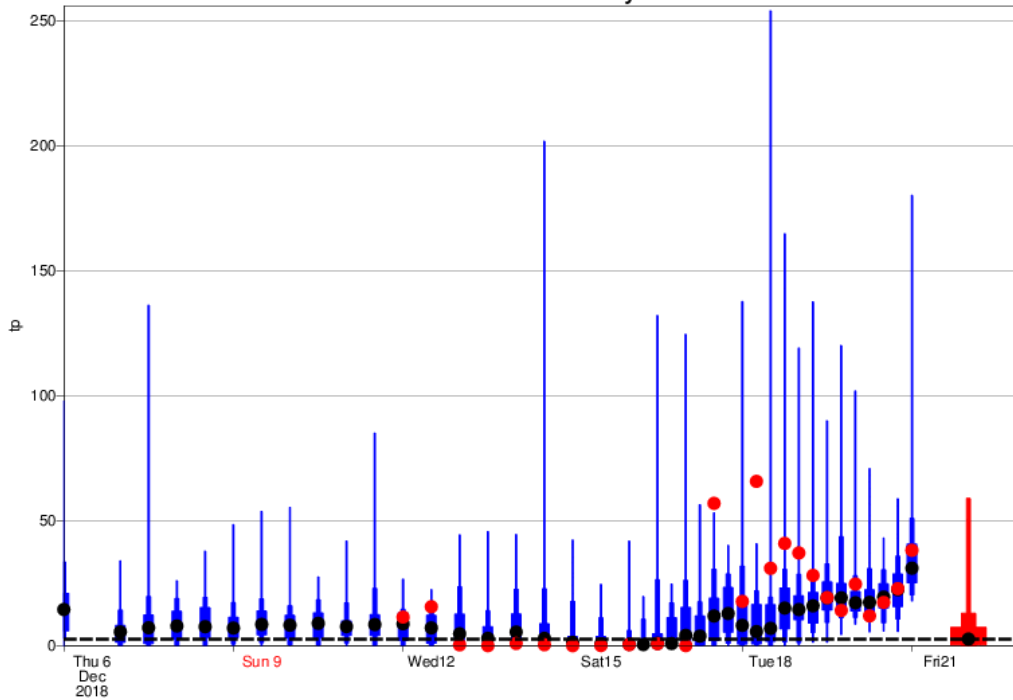
Sat 15 Dec 2018 00UTC @ECMWF VT: Fri 21 Dec 2018 00UTC - Sat 22 Dec 2018 00UTC 144-168h

Extreme forecast index and Shift of Tails (black contours 0,1,5,10,15) for: total precipitation



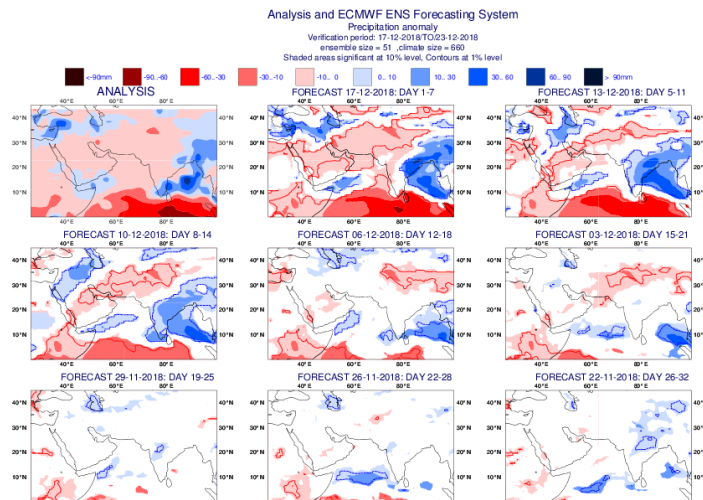
The plot below shows the forecast evolution for 24-hour rainfall on 21 December for a point north of Maankulam, which got more than 300 mm during the day. The blue box-and-whisker shows the ensemble distribution, the red dot the HRES forecast and the red box-and-whisker the climate distribution based on re-forecasts.

Maankulam ndays:1



3.4 Monthly forecasts

The figure below shows verification of weekly precipitation anomalies for 17-23 December. The first panel shows the anomalies in the analysis and subsequent panels the forecast valid to the same week.



3.5 Comparison with other centres

4. Experience from general performance/other cases

- Rainfall in Sri Lanka from May 2017: [201705 - Rainfall - Sri Lanka](#)

5. Good and bad aspects of the forecasts for the event

- HRES had large precipitation amounts locally in the region for 21 December in forecasts from 17 December and onwards.
- Focusing on one site, the probabilities for extreme rainfall was low.
- Ensemble mean in short forecasts around 20-40 mm/24h.

6. Additional material