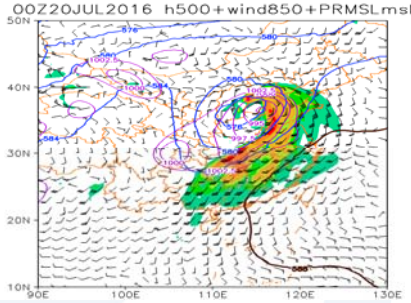
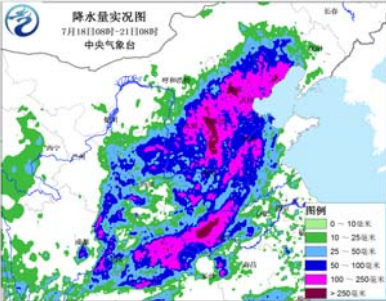


# Analysis of the extreme rainfall event in North China in 19-20 July 2016 and its forecast performance of ECMWF's products

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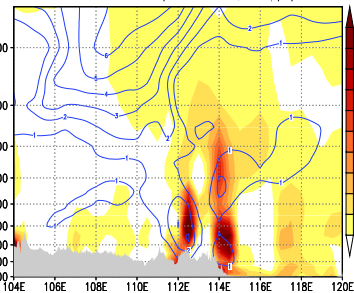
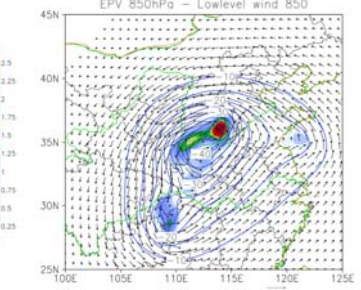
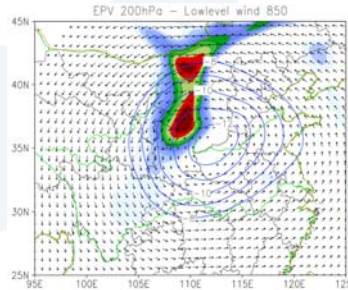
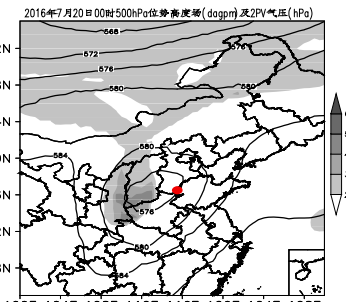
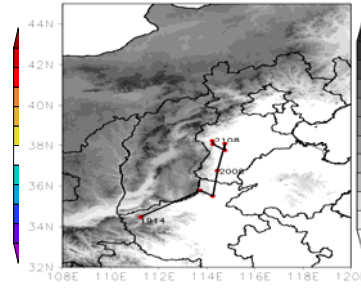
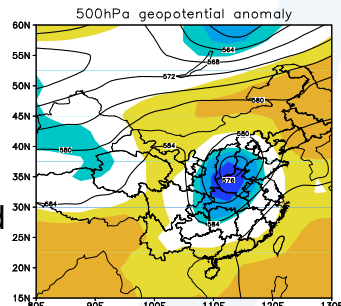
## Background



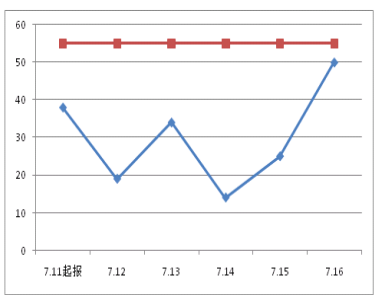
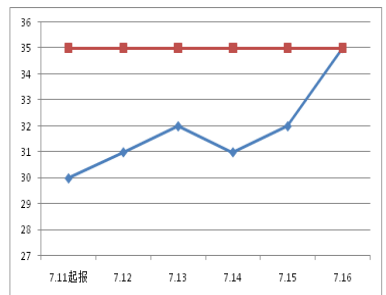
- The extreme rainfall event occurred on 19-20 July 2016 in North China.
- A server storm with southwesterly and southeasterly low level jet accounted for the event.
- Topographic effects on rainfall were significant.

## Development of Cut-off vortex and cyclone

- The cut-off vortex and Huanghuai cyclone abnormally developed and moved very slowly.
- Positive potential vorticity abnormal at upper-level and latent heat due to rainfall may be the reasons of the development of cyclone.



## Performance of ECWFM's products



- For the middle-range forecast, earlier forecasts before July 15 had the precipitation further south with a zonal rainfall belt, which is mainly due to the pattern error of the Western Pacific subtropical high.

## Conclusion

- The extreme rainfall event is related to the strong synoptic forcing. But its predictability is under low level in middle range forecast.
- Forecasters and the model both under-evaluated the effects of topography on rainfall.

## References

Sun J., Chen Y., et al.. Analysis and Thinking on the extremes of the 21 July 2012 Torrential rain in Beijing, Part I and Part II. 2012, Meteorological Monthly. (in Chinese)

