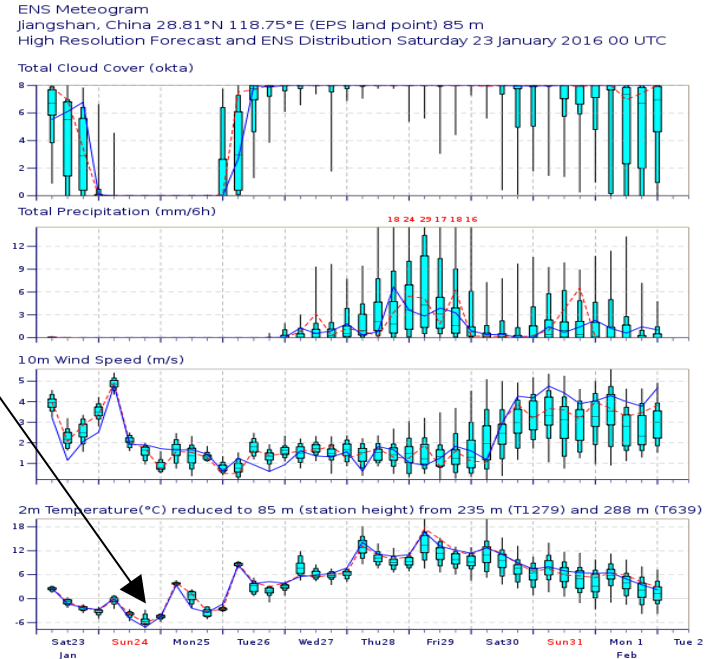
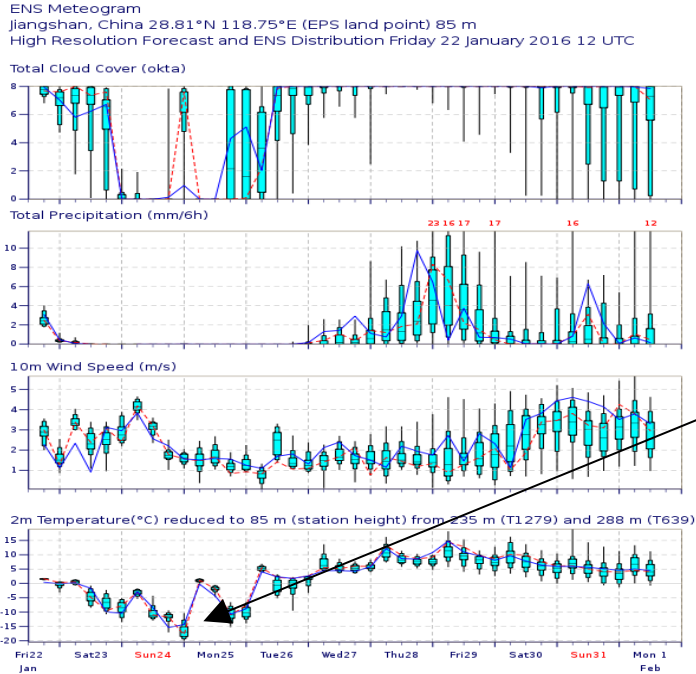


# A forecast case during the current episode of cold air outbreak in China, Jan 2016: What lies behind the major discrepancies behind the ECMWF forecasts with base time 12 UTC 22 Jan and 00 UTC 23 Jan?

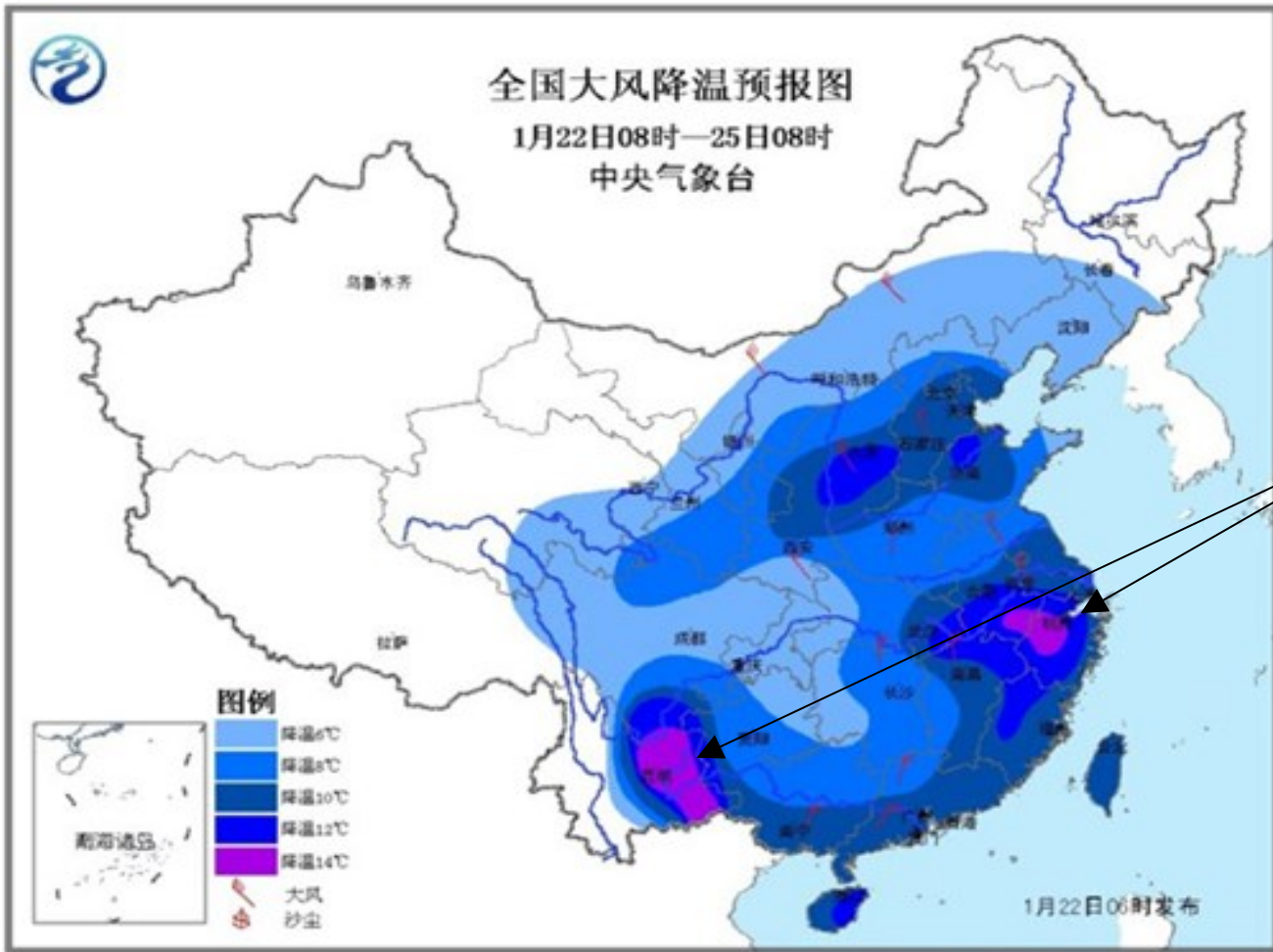


**Operational** ECMWF fcst for station Jiangshan,  
China, Basetime Jan 22, 12 UTC

base time Jan 23, 00 UTC

Materials from ECMWF website, collected by Xiaohua Yang, DMI





Predicted T2m drop in China by **CMA** during the cold wave Jan 22 and 25, 2016

Predicted T2m drop by more than 14 C by CMA

(CMA.gov.cn)

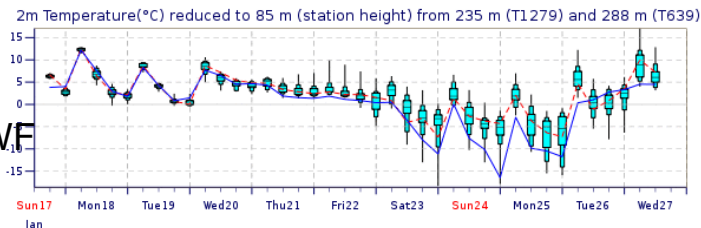
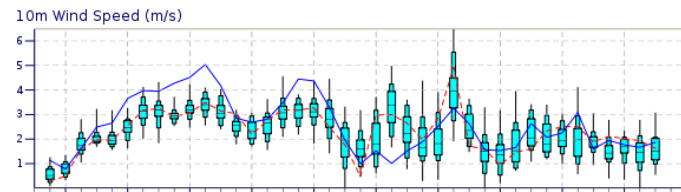
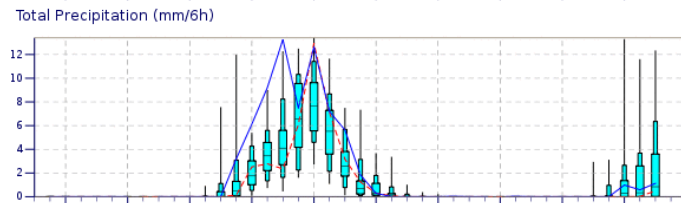
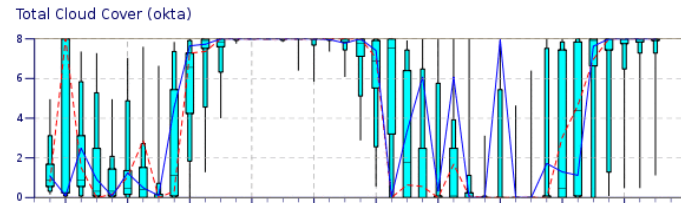


\* Jiangshan, Zhejiang province, China.  
Historical winter T2m minimum -6.9 C

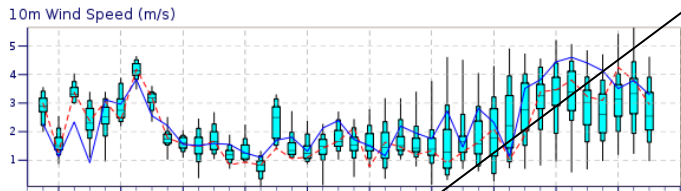
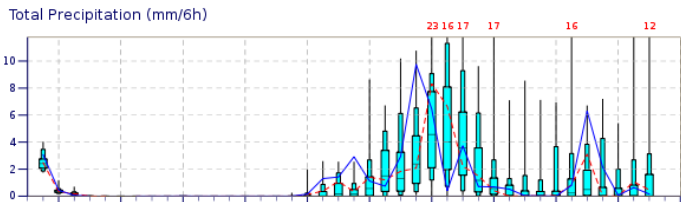
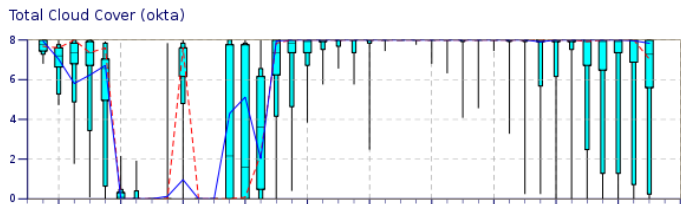
Meteogram from ECMWF with basetime from 17 to 24 Jan, for station Jiangshan, Zhejiang, China

Starting from basetime Jan 17, operational forecasts from ECMWF (Highres, ENS) predicted rather consistently a minimum T2m temperature of ca -15C or lower with peak time between Jan 24 and Jan 25, until the runs with basetime 00 UTC Jan 23 when predicted minimum temperature suddenly rose up to ca -5 C.

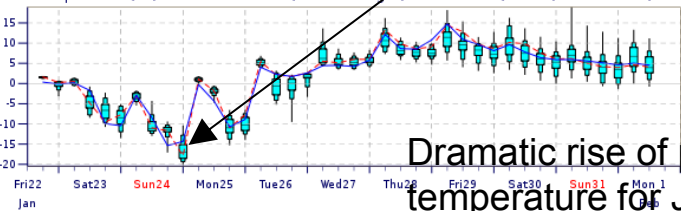
ENS Meteorogram  
Jiangshan, China 28.81°N 118.75°E (EPS land point) 85 m  
High Resolution Forecast and ENS Distribution Sunday 17 January 2016 12 UTC



ENS Meteorogram  
 Jiangshan, China 28.81°N 118.75°E (EPS land point) 85 m  
 High Resolution Forecast and ENS Distribution Friday 22 January 2016 12 UTC



2m Temperature(°C) reduced to 85 m (station height) from 235 m (T1279) and 288 m (T639)



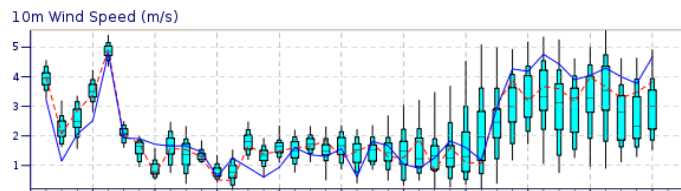
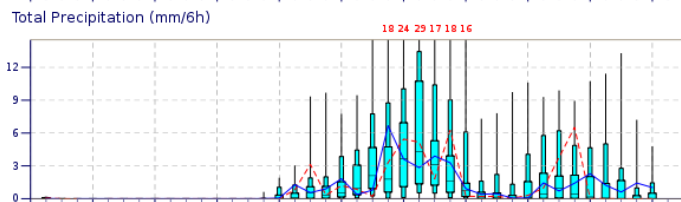
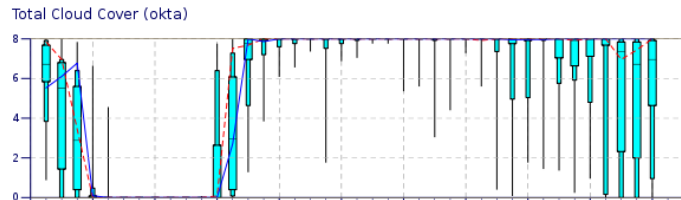
T2m ~ -15c  
 (about 10 degree  
 lower than  
 historical record)

T2min ~ -5C

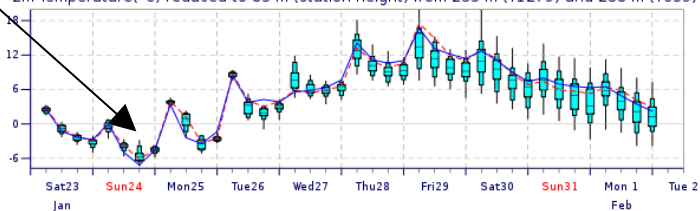
Dramatic rise of predicted minimum T2m  
 temperature for Jiangshan, from forecasts at  
 basetime 22 Jan 12 UTC (left) to 23 Jan 00  
 UTC (right)



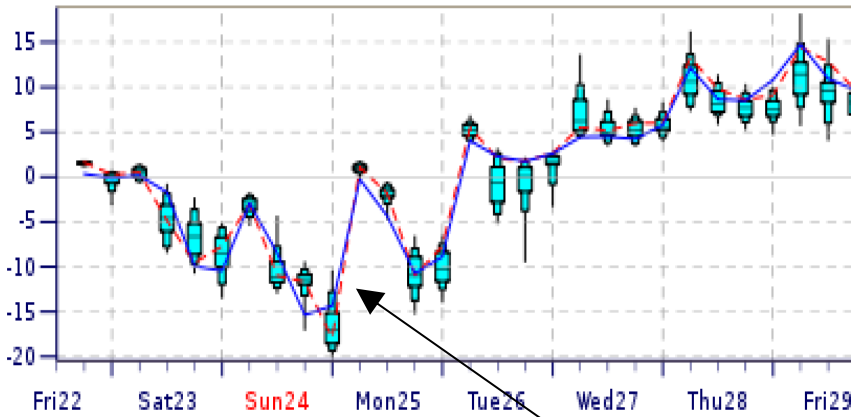
ENS Meteorogram  
 Jiangshan, China 28.81°N 118.75°E (EPS land point) 85 m  
 High Resolution Forecast and ENS Distribution Saturday 23 January 2016 00 UTC



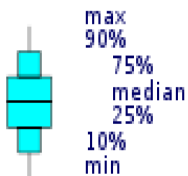
2m Temperature(°C) reduced to 85 m (station height) from 235 m (T1279) and 288 m (T639)



2m Temperature(°C) reduced to 85 m (station height) from 235



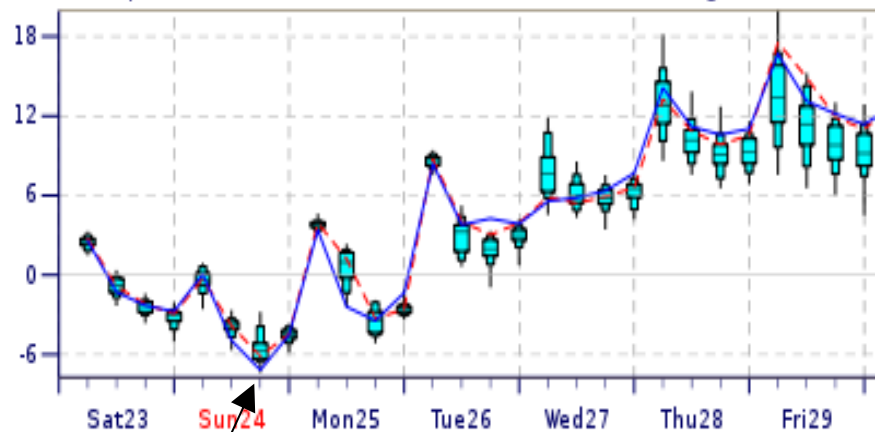
Jan



ENS Control(31 km) High Resolution (16 km)

T2m for station Jiangshan,basetime 12 UTC, 22 Jan 2016

2m Temperature(°C) reduced to 85 m (station height) from 23



Jan



ENS Control(31 km) High Resolution (16 km)

T2m, basetime 00 UTC, 23 Jan 2016

Dramatic rise of predicted minimum T2m temperature for Jiangshan from one cycle to next.

Note that even the highest predicted T2m for 00 UTC, 25 Jan from the ENS run with base time 12 UTC, 22 Jan ( left side ) is significantly colder than the lowest predicted T2m (right side) with basetime 00 UTC 23 Jan



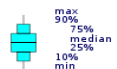
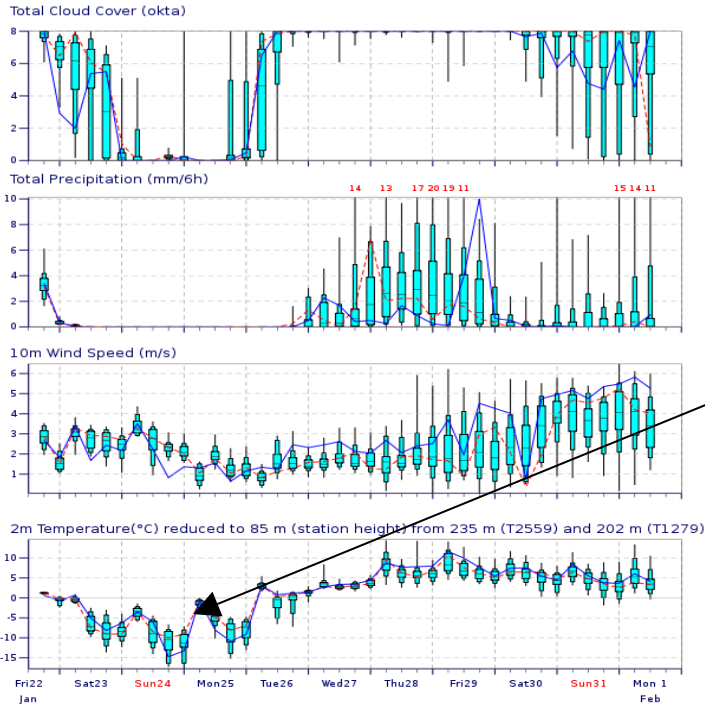


Similarly sharp contrast between forecasts before and after 23 Jan can be seen from the meteograms for other nearby area/stations: Quzhou, Hangzhou. (However, forecasts for Shanghai appears to have been rather consistent).

Results from ECMWF e-suite with both deterministic and ENS show similar trend.

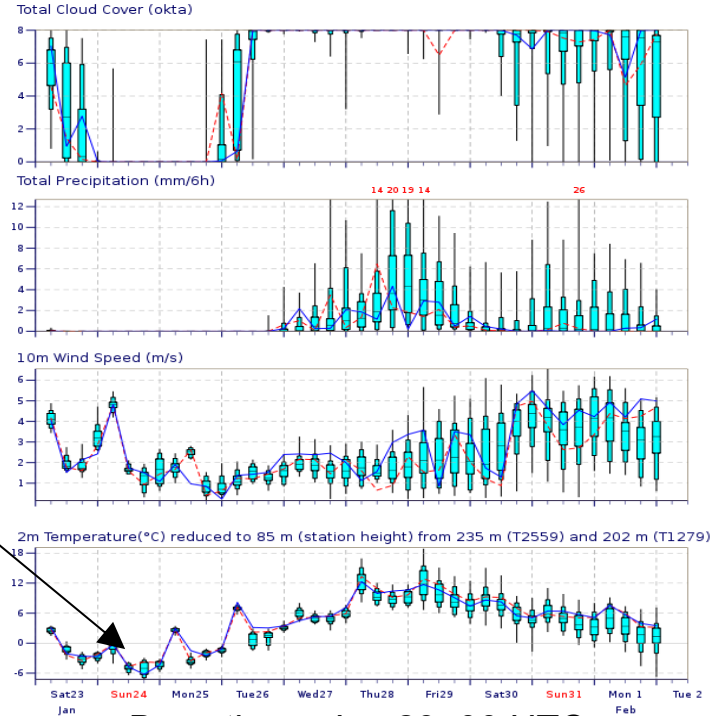
# Similar contrast can be seen from the metograms based on e-suite with both deterministic and ENS runs, with abrupt change between 22 and 23 Jan.

ENS Meteogram [0069]  
 Jiangshan, China 28.75°N 118.64°E (EPS land point) 85 m  
 High Resolution Forecast and ENS Distribution Friday 22 January 2016 12 UTC



ENS Control(16 km) High Resolution(8 km) Base time Jan 22, 12 UTC

ENS Meteogram [0069]  
 Jiangshan, China 28.75°N 118.64°E (EPS land point) 85 m  
 High Resolution Forecast and ENS Distribution Saturday 23 January 2016 00 UTC

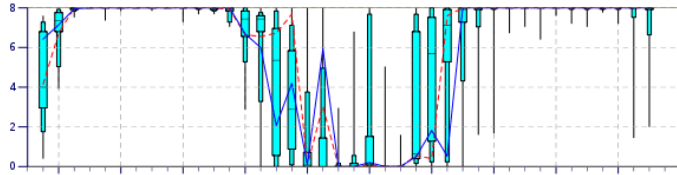


ENS Control(16 km) High Resolution(8 km) Base time Jan 23, 00 UTC

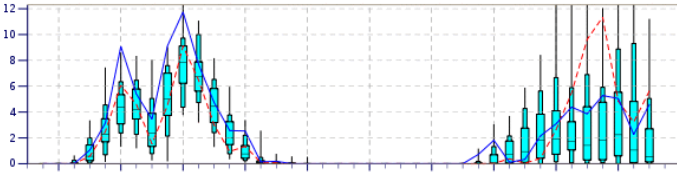


ENS Meteogram [0069]  
Jiangshan, China 28.75°N 118.64°E (EPS land point) 85 m  
High Resolution Forecast and ENS Distribution Tuesday 19 January 2016 12 UTC

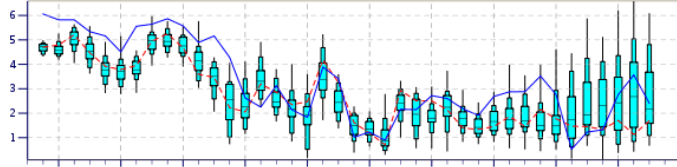
Total Cloud Cover (okta)



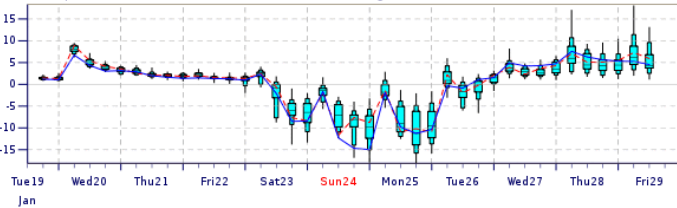
Total Precipitation (mm/6h)



10m Wind Speed (m/s)



2m Temperature(°C) reduced to 85 m (station height) from 235 m (T2559) and 202 m (T1279)

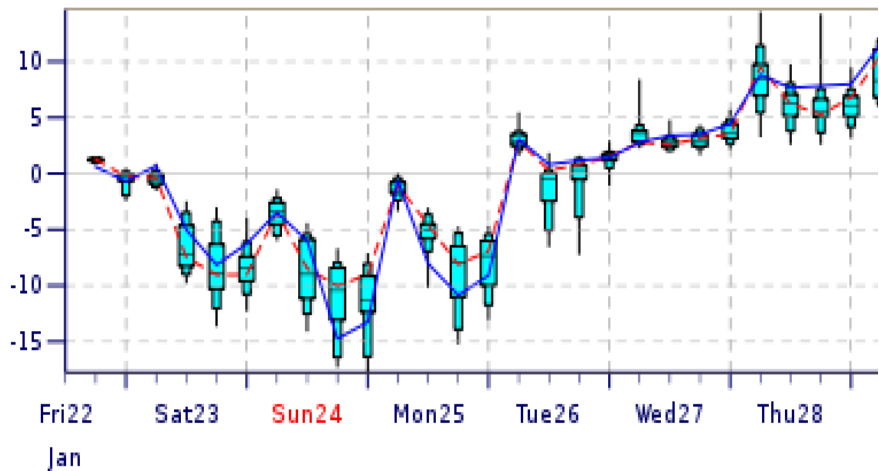


## EPS meteogram from ECMWF e-suite

Rather consistent forecast of the minimum T2m temperature of ca -15C or lower for Jan 24 and Jan 25, ... until the runs with basetime starting 00 UTC Jan 23 , when predicted minimum temperature suddenly moves up to ca -5 C.

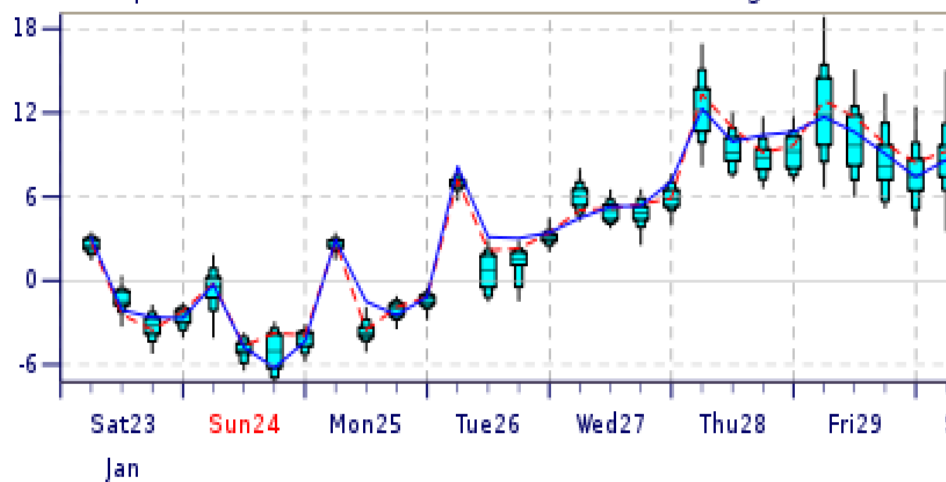


2m Temperature(°C) reduced to 85 m (station height) from



T2m for Jiangshan by e-suite,  
 basetime 12 UTC, 22 Jan 2016

2m Temperature(°C) reduced to 85 m (station height) from 235



T2m for Jiangshan by e-suite, base  
 time 00 UTC, 23 Jan 2016



## Questions

What could be the main factors/explanations behind the abrupt change in predicted T2m evolution for the station of Jiangshan around the peak time of the cold spell during this episode, (with peak time 00 UTC Jan 25): were the change associated with assimilation of certain critical observation data?

Most likely, such change in predicted evolution with an individual station is associated with change of spatial phase in a large scale situation. Nevertheless, is the temporal inconsistency we see here anyhow an indication of insufficient spread with ENS, as the changes between runs are so dramatic?

Is the reported phenomena an issue at all to NWP modeller?