Objective forecasting product system for aviation meteorological services in China National Meteorological Center

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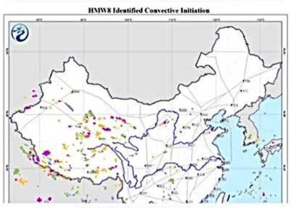
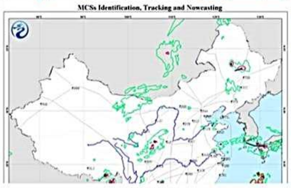
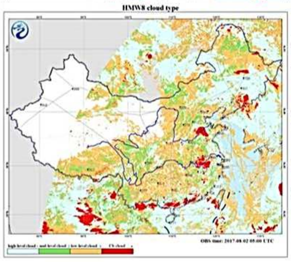
Due to the increasing demand of the aviation meteorological service in the short-time forecasting and nowcasting of the disastrous weather, especially the severe convective weather, China's National Meteorological Center (NMC) has developed short-time forecasting and nowcasting techniques which can be applied to aviation meteorological services. These techniques are introduced in this article. They include probability-matching calibration method, neighborhood approach, multi-model integration method for precipitation and radar echo, time-lag precipitation correction method, precipitation forecasting method based on Titan and auto-station data, deep learning etc. These methods have been used for short-time forecasting and nowcasting of thunderstorm, short duration heavy rain, thunderstorm wind and hail. These techniques have improved and promoted the short-time forecasting and nowcasting of the severe convective weather to some extent. The application of these technologies to aviation meteorological service will meet the urgent need of aviation weather for the short-time forecasting and nowcasting of the severe convective weather. The application of the above method shows good results to some extent. These technologies have a significant role to play in decision-making, whether for the weather forecasters at the airport or for the airport's controllers. It also improves the level and accuracy of the short-time forecasting and nowcasting for severe convective weather to a certain extent.

SATELLITE

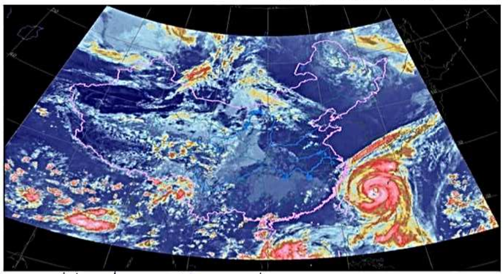




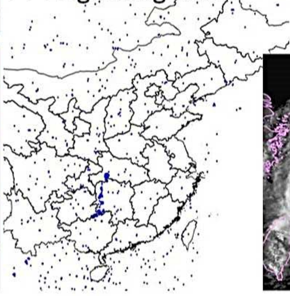


FY4

spatial resolution: **4km~500m**
time resolution: 15min

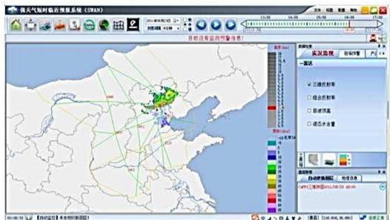


FY4 Lightning data

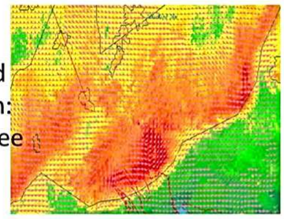


↑IR1product
↓VISproduct

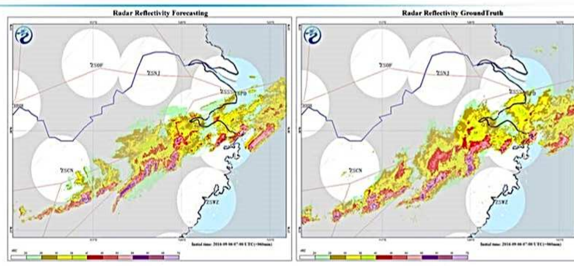
AVIATION PLATFORM



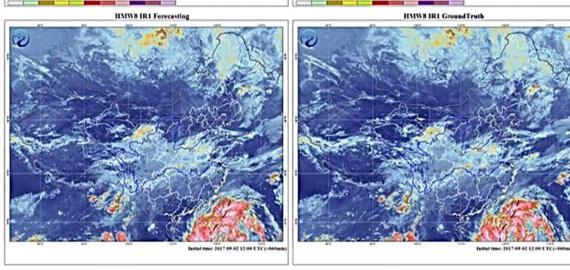
3DVar→
Wind field
resolution:
0.02 degree



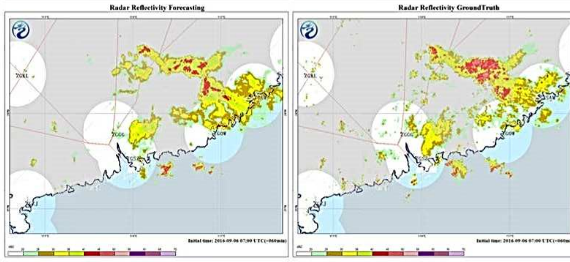
MACHINE LEARNING



Radar echo Forecast use Opticalflow method



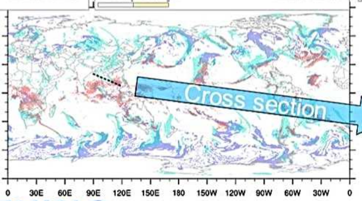
Satellite extrapolation use Opticalflow method

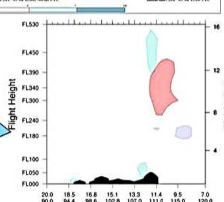


Radar extrapolation use Deeplearning method

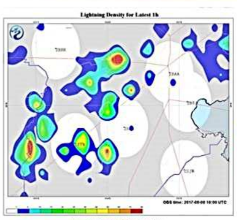
AIRLINE PRODUCT BASED GRAPES

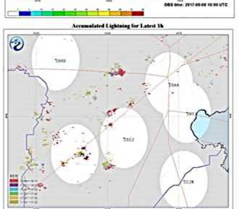
→ Icing, turbulence and Cb cloud forecast

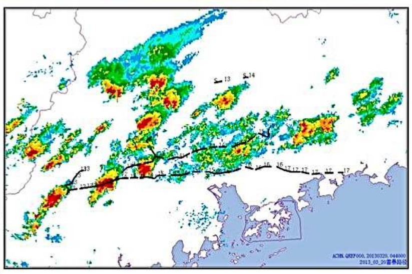




LIGHTNING

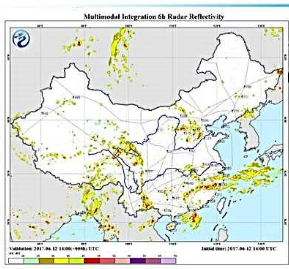






↑convection extrapolation based on lightning data

MULTIMODAL INTEGRATION



← probability matching 6h accumulated precipitation

→ probability matching radar reflectivity in 6h