

A Case Study of Seeding Condition Potential Forecast Using Cloud Resolving Model

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The cloud precipitation explicit forecast system (CPEFS_V1.0) was used to forecast the seeding condition potential on celebrating activities for the 70th anniversary of the founding of Inner Mongolia Autonomous Region. The results showed that due to eastward movement of short wave trough and low-level shear line, water vapor condition in Hohhot region was better, unstable energy was higher, and convective weather was easy to trigger. In the morning of Aug. 8, 2017, convective clouds were appeared in the northwest direction of the core zone. Convective clouds rapidly developed and moved eastward and southward to the core zone. Lifetime of convective clouds was about 1.5-3 hours, and horizontal scale was about tens of kilometers. The generation time of convective clouds of forecast was 1-2 hours later than the observation, and moving direction was consistent with observation. Moving speed was $10\text{-}20\text{ km}\cdot\text{h}^{-1}$ slower. Convective clouds had vertical structure of cold-warm mixed clouds, with large updraft, high content of snow and graupel, low cloud water content in warm regions, cloud top height of 10 km, cloud bottom height of 3 km, 0°C height of 4.3 km, maximum content of supercooled water of $0.7\text{ g}\cdot\text{kg}^{-1}$, less ice crystals in areas with rich supercooled water, these characteristics were consistent with satellite, radar and airborne detection. In the afternoon of Aug. 7, key defense zone was chosen to the west of the core zone. Agl over-seeding would be implemented during 5100 –7000 m height. In the morning of Aug. 8, the aircraft would carry out detection in weak echo area of the first defense line. Ground operations would focus on the implementation of over-seeding in the initial stage of convective clouds in the third defense line to achieve the goal of mitigation rainfall. Based on forecast, additional five sets of ground mobile seeding equipment had been added temporarily to reinforce the capability of rain mitigation operated on Aug. 8. Seeding condition for the 70th anniversary celebration was better forecast.

Keywords: seeding condition potential forecast, seeding operation plan, convective cloud precipitation, major activity guarantee, weather modification