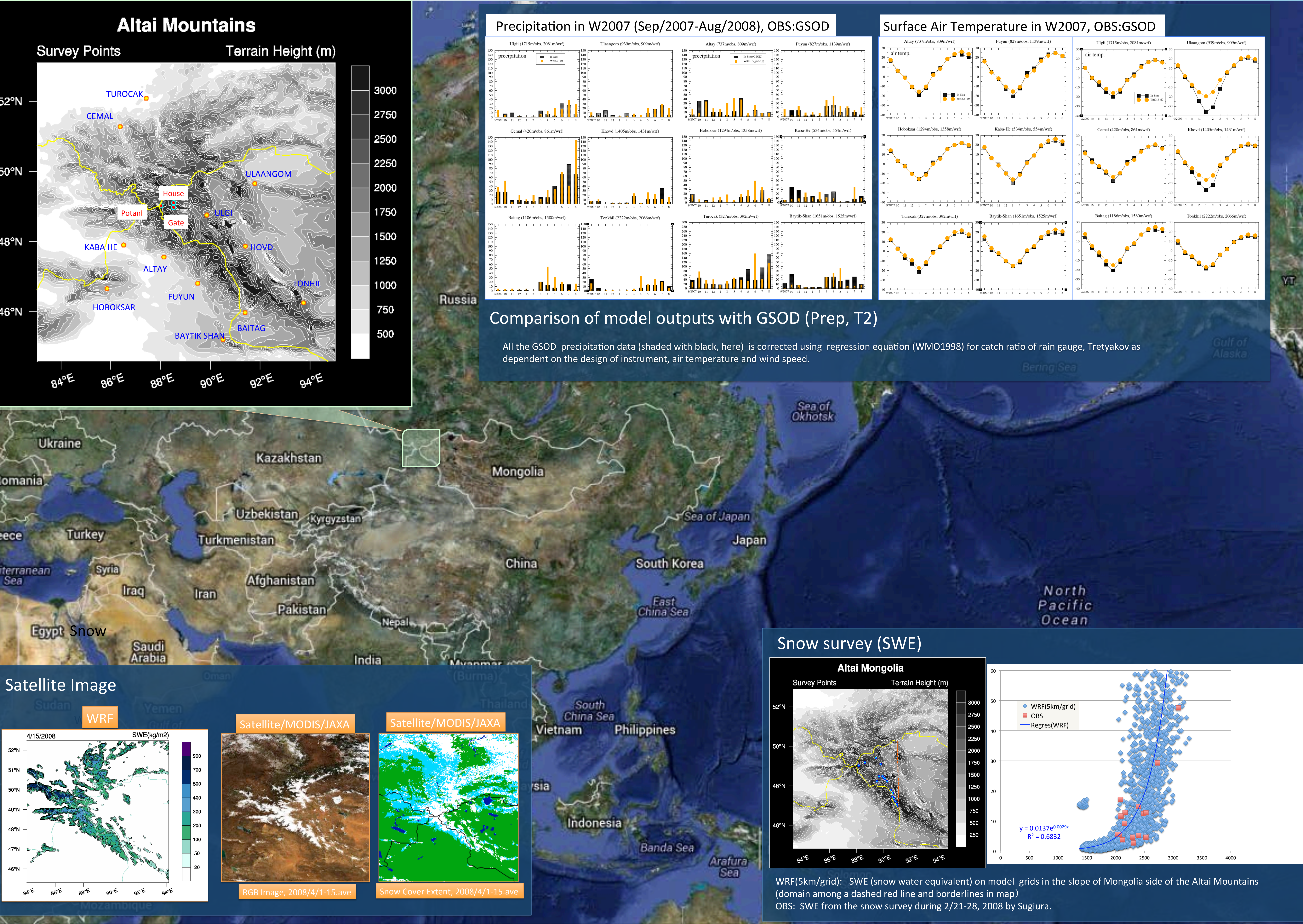
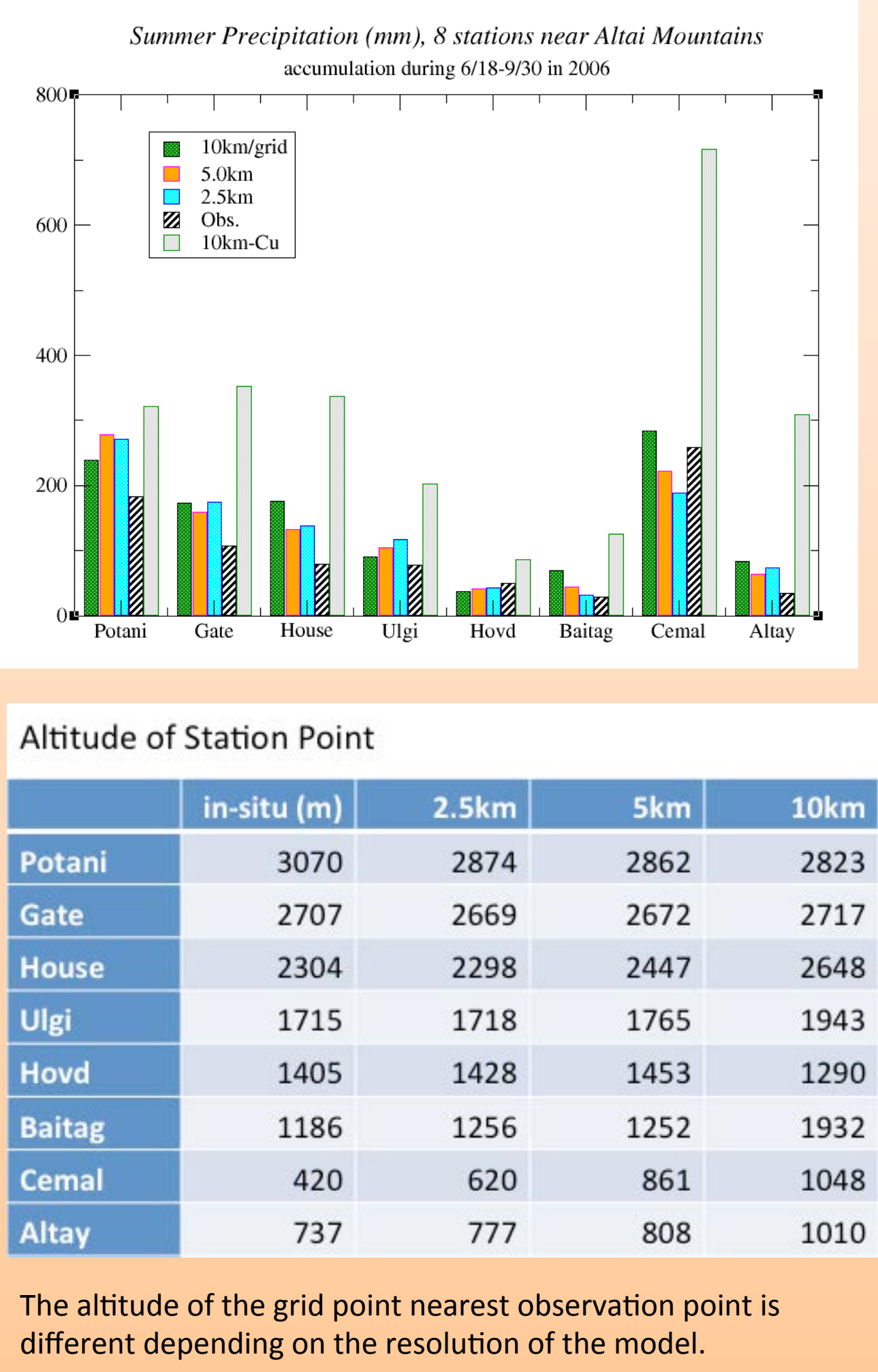


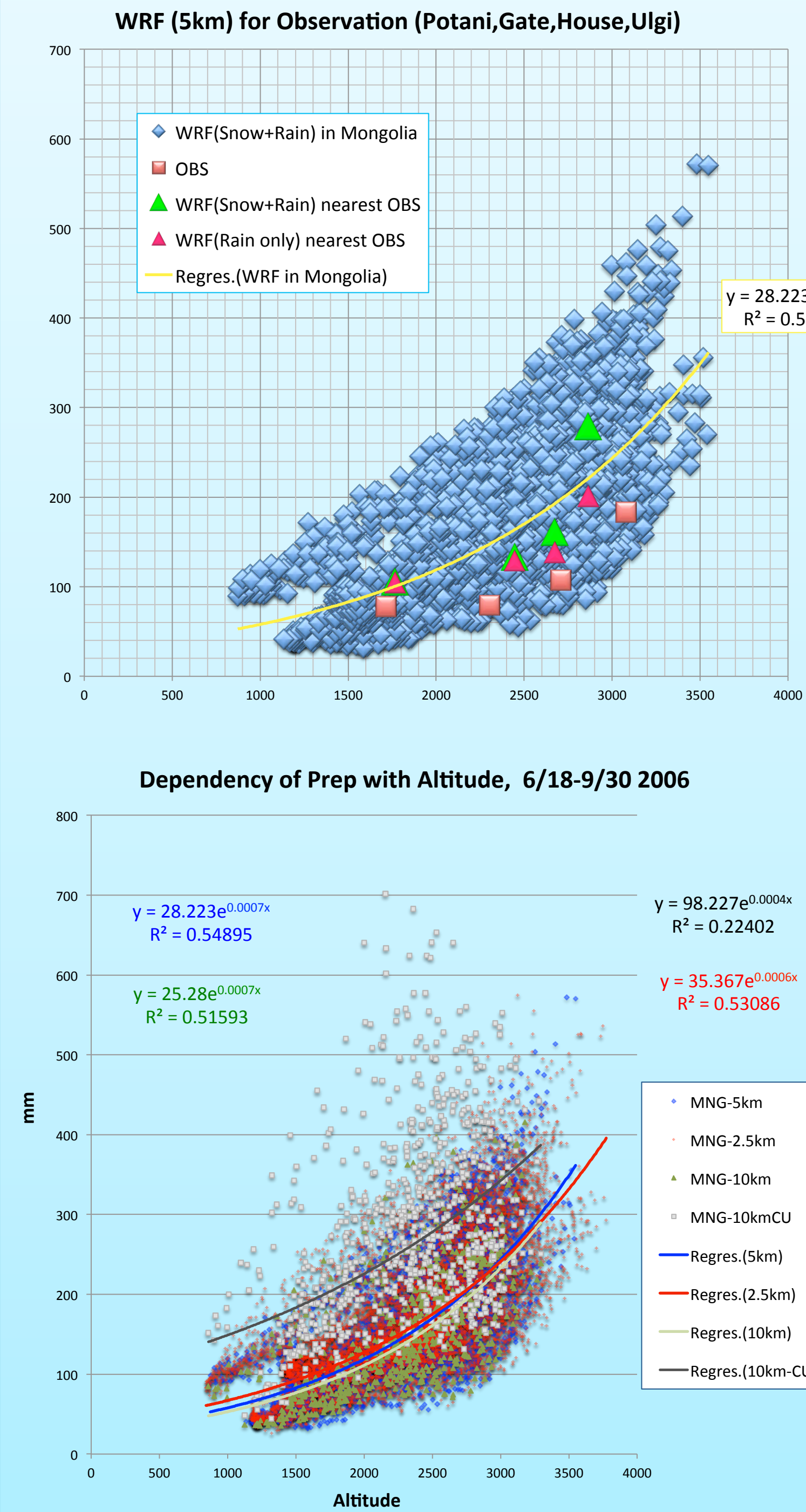
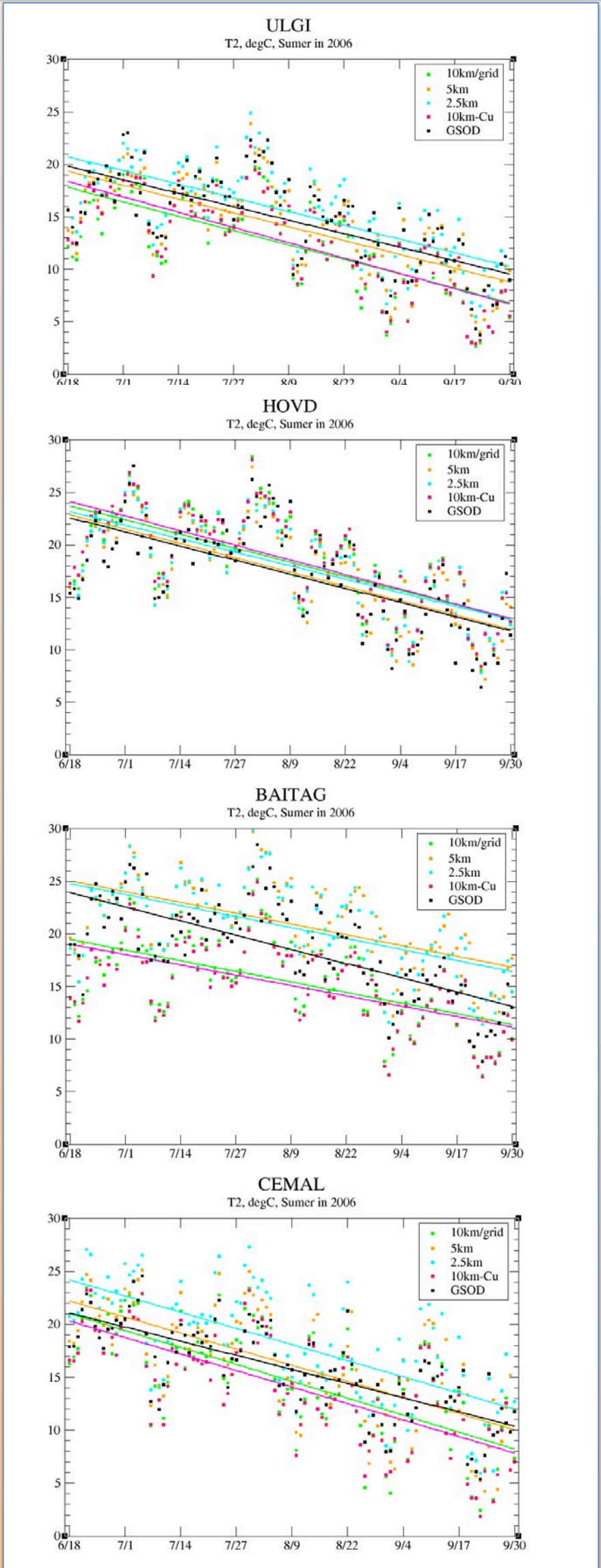
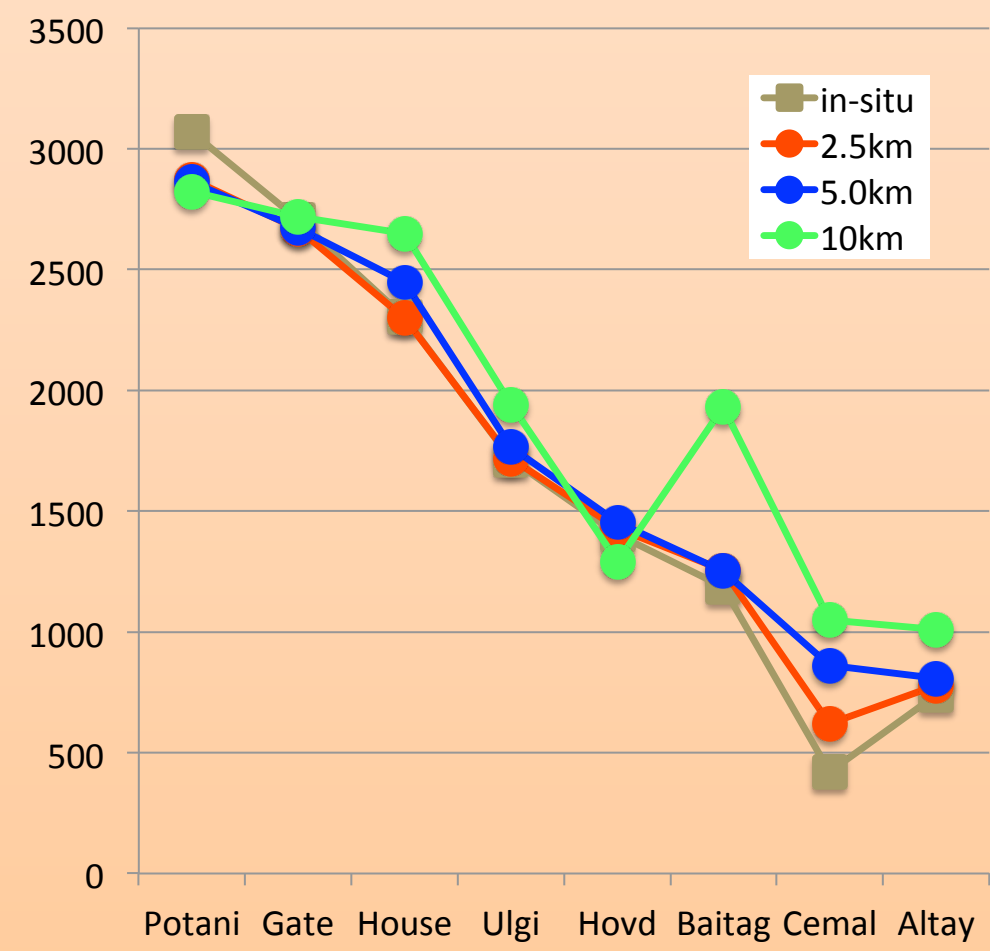


Grid Resolution Dependency (2.5, 5.0, 10km/grid)



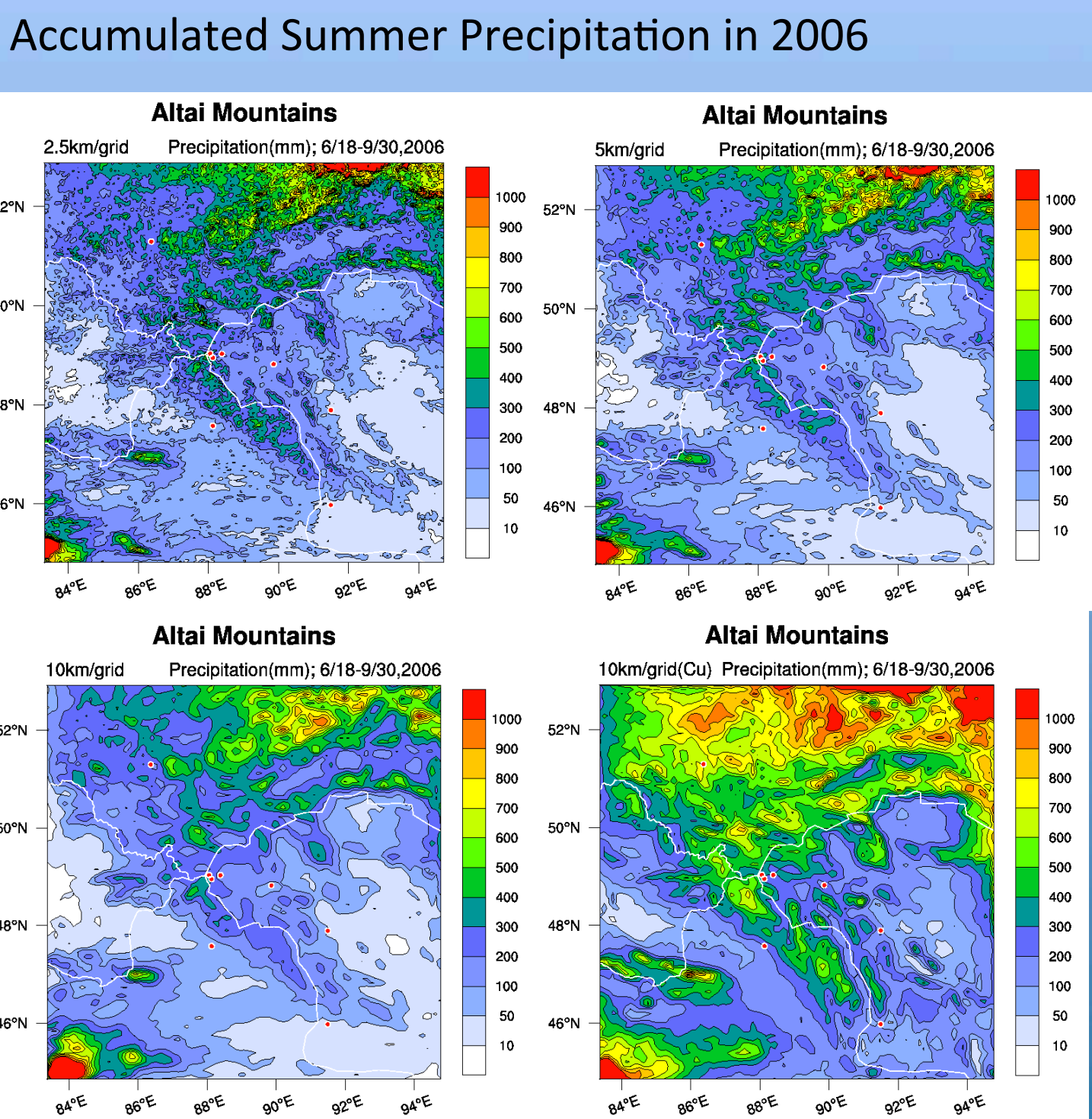
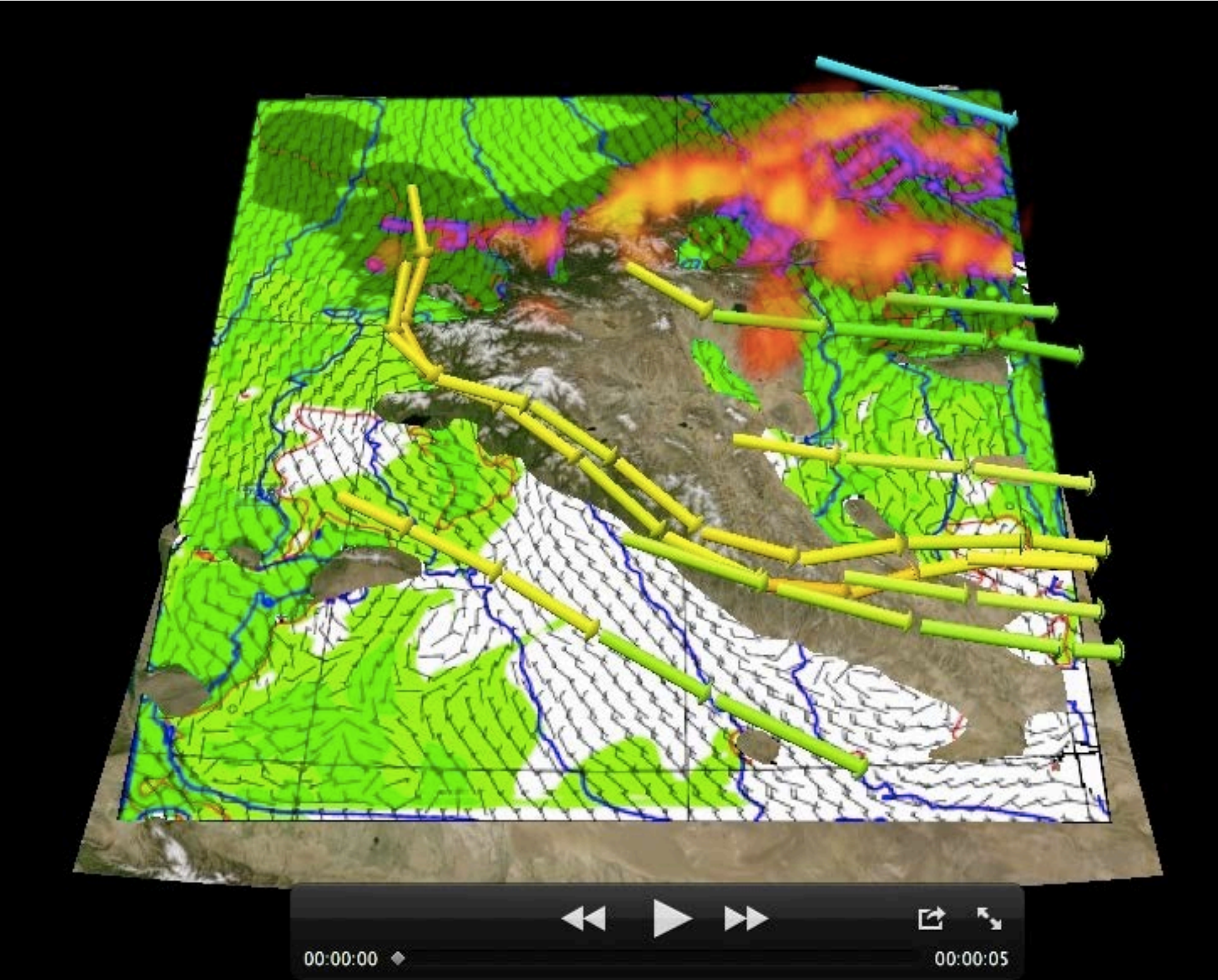
The left bar graph shows the summer precipitation amounts for the resolution of 2.5, 5.0, 10km (microphysics only) and 10km added cumulus parameterization, compared with observations (Kadota2006 and GSOD). The right one consisting of four sets of graph represents the comparison with the daily surface air temperature of each in-situ observation. The 5km resolution does not have inferiority than 2.5km. As for 10km, reproducing of the temperature to depend on difference in altitude is not good, and the use of the cumulus parameterization is not suitable.

cu_physics: previous Kain-Fritsch scheme



Total summer precipitation amounts of WRF (5km) on all grids in the slope of Mongolia side of the Altai Mountains are plotted out by blue markers and their regression curve is drawn in the figure, comparing with in-situ observations (Potani, Gate, House and Ulgi) of higher altitude, for 6/18-9/30, 2006.

In addition, both the liquid and total precipitation amounts including snow fall on the grids of the nearest observation points are shown in the figure. We should consider that the observation of solid precipitation with Tretyakov gauge is underestimated at the region of less precipitation. The data at Potani, Gate, House are without correction.



- ### WRF model setup
- Model Version : WRF3.3
 - Domain : Single (1000km x 1000km), Lambert
 - Horizontal-Res: 5km/grid, (compared with 2.5km, 10km/grid)
 - Mellor-Yamada-Janjic (MJV) Planetary Boundary Layer scheme
 - New Thompson (2008) microphysics scheme
 - Kain-Fritsch (previous) convective scheme, for 10km-CU
 - CAM longwave and shortwave scheme
 - Noah Land surface model
 - Geog_data : landuse_30s_with_lake
 - Input data : NCEP/NCAR Global Reanalysis Products
 - 2.5 degree resolution, every 6 hours

- ### Verification data
- Global surface summary of day product (GSOD) by NCDC
 - Satellite Image by MODIS/JAXA
 - Kadota et al. (2006), Observation of summer Precipitation at Potani, Gate, House
 - Sugiura (2008), Snow survey in Altai Mongolia

Reference
WMO1998: WMO SOLID PRECIPITATION MEASUREMENT INTERCOMPARISON FINAL REPT by B.E. Goodison and P.Y.T. Louie and D. Yang

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