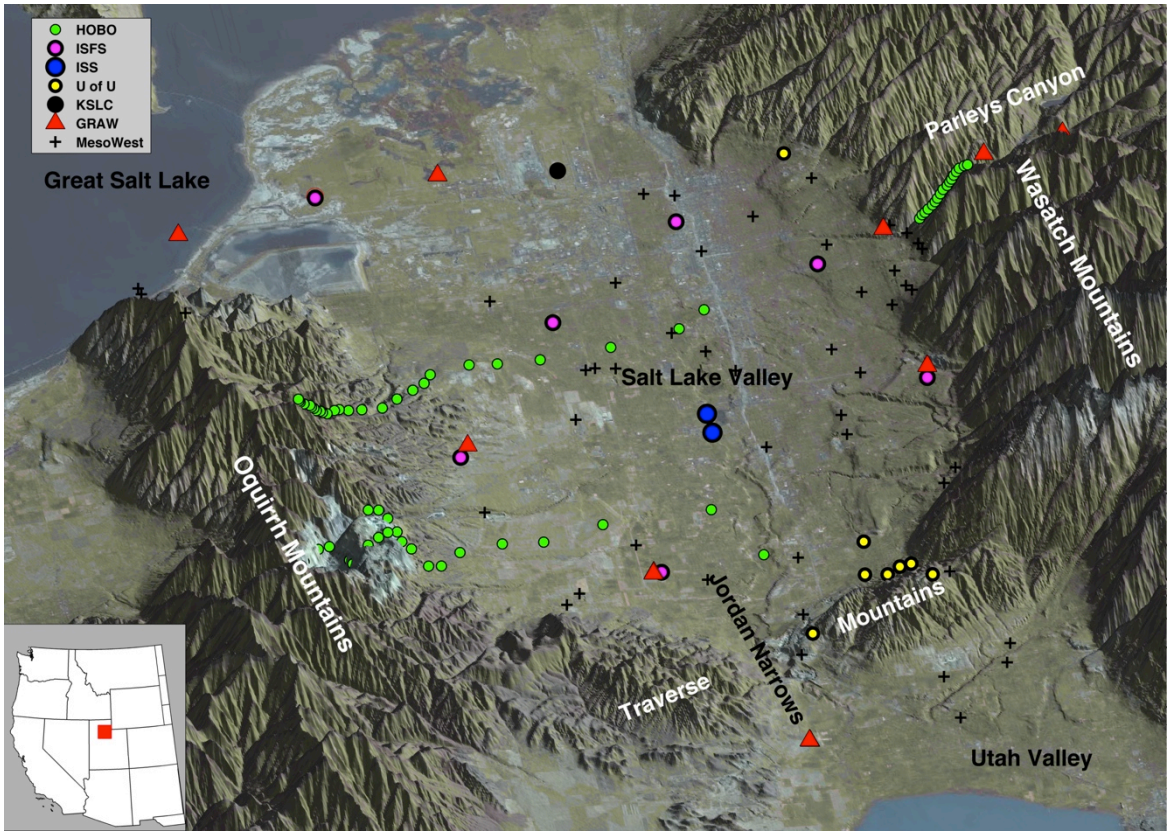

Figure 1. Relief map showing location of PCAPS field campaign instrumentation. Green circles denote the location of Hobo® data loggers on the valley sidewalls. Purple circles and white numbers denote the 7 NCAR ISFS stations. Blue circles indicate the two NCAR ISS facilities, and a red plus symbol denotes the SODAR site. Yellow circles indicate University of Utah automated weather stations, while pre-existing MesoWest surface stations are indicated with a black plus symbol. The Salt Lake International Airport is denoted as a black dot. The locations of special radiosonde launches during specific IOPs are indicated by red triangles, while a blue plus shows the location of the LIDAR. The Hawthorne elementary school DAQ site is shown as a pink triangle. Mobile weather station transects, glider flight paths, and additional air quality monitoring locations are not shown on the map

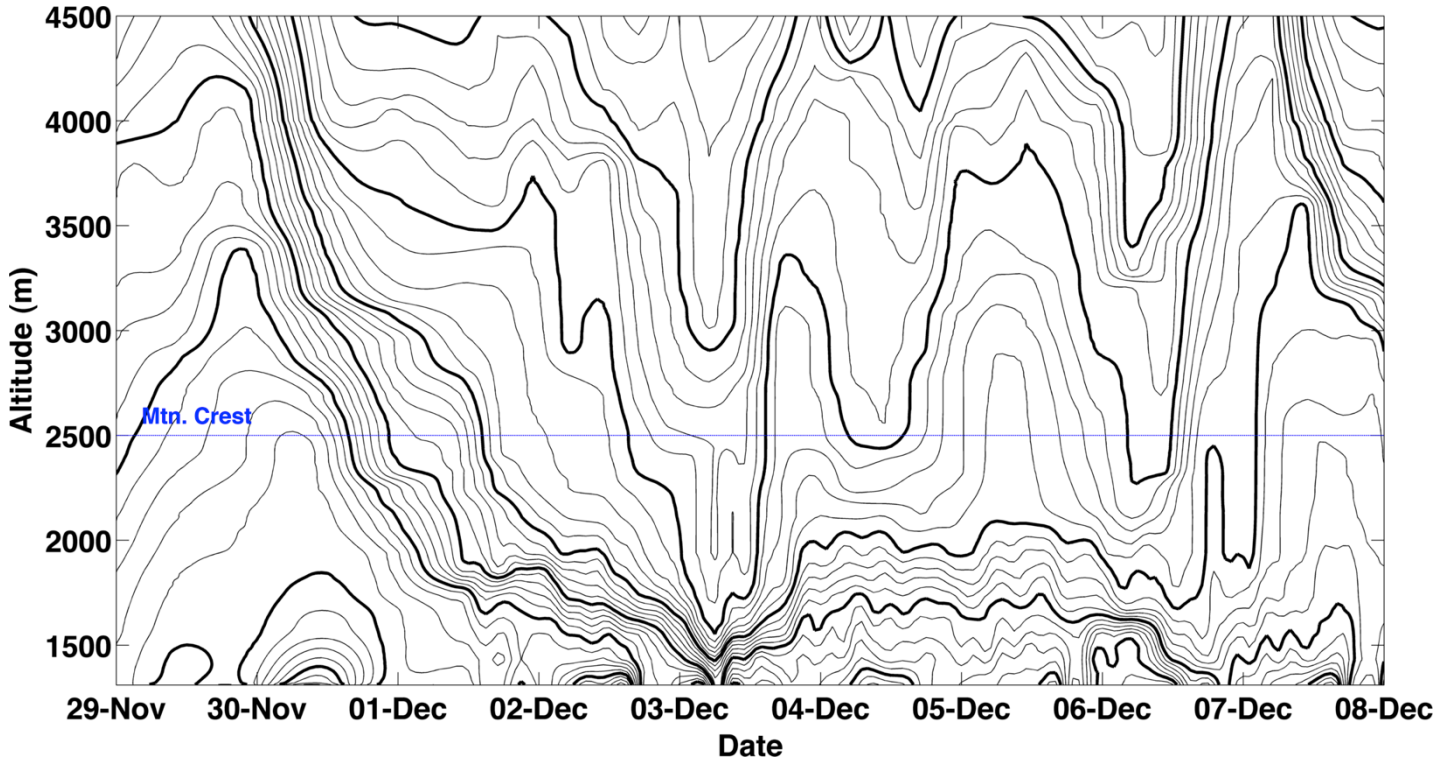

Figure 2 Time-height plot of potential temperature during PCAPS IOP-1. Isentropes are indicated by contours (bold contours every 5K, light contours every 1 K). The approximate crest of the confining topography is indicated.

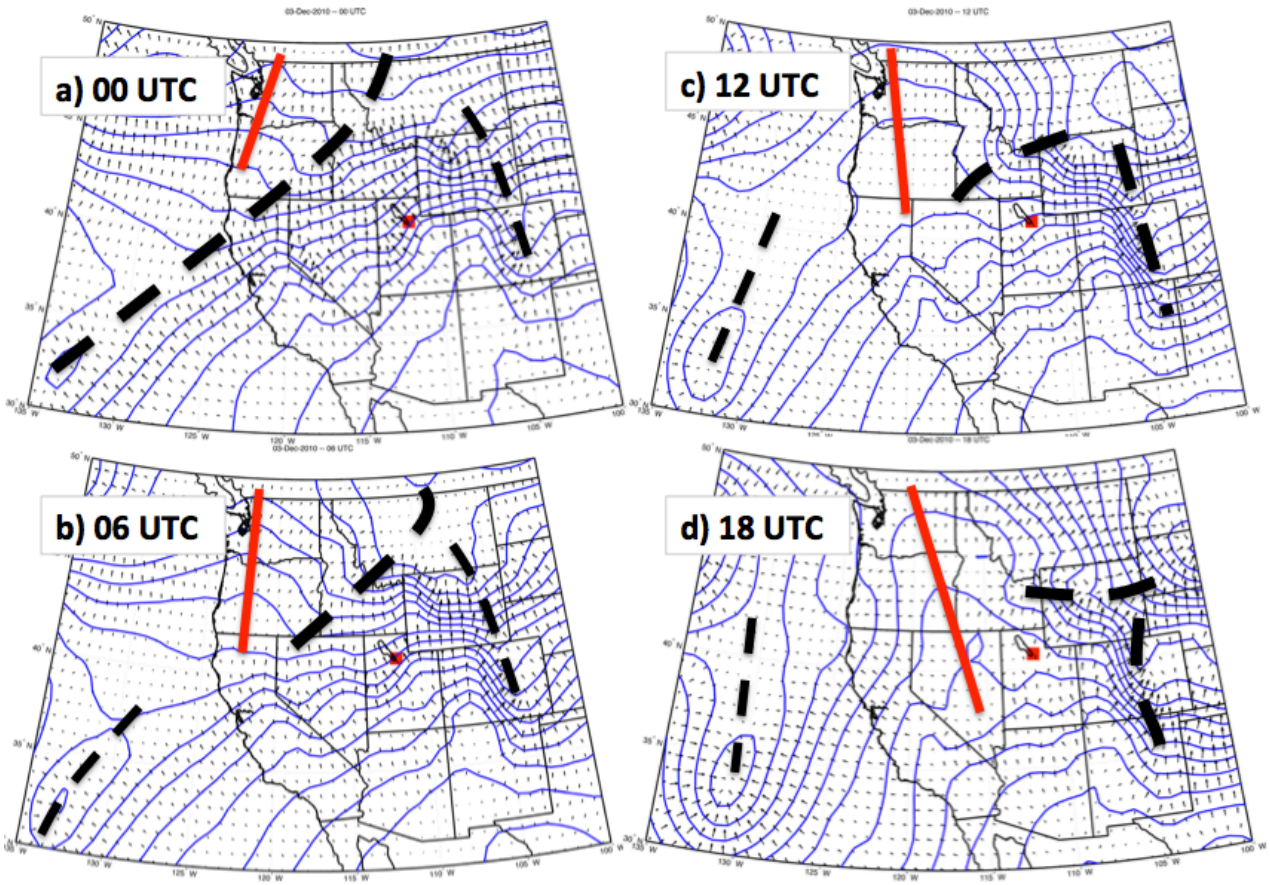

Figure 3. 800 hPa geopotential height (contours) and negative pressure gradient vectors for 3 December 2010. Dashed lines indicate the position of trough axes, and red lines ridge axes.

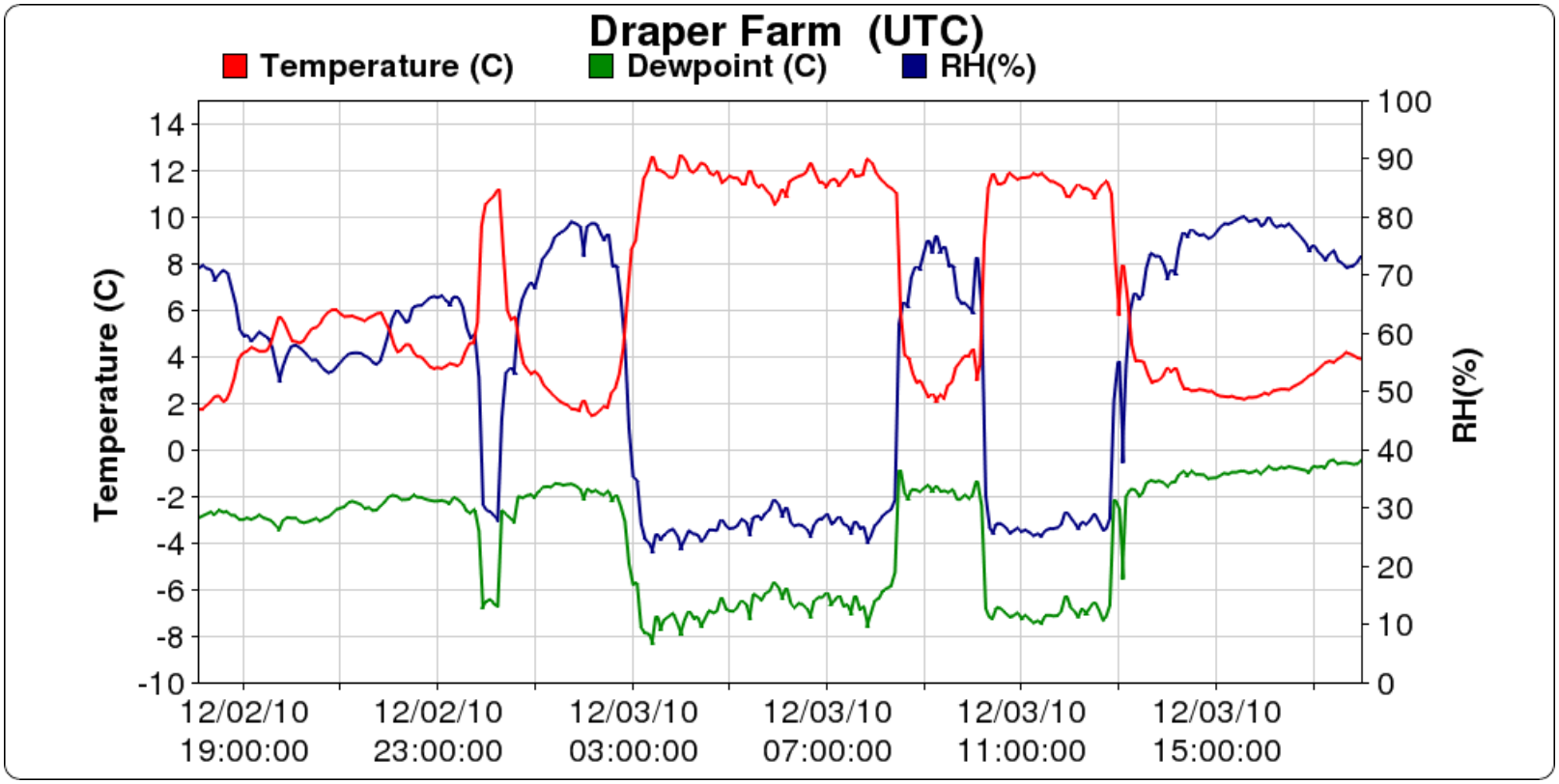

Figure 4. Temperature, dew point, and relative humidity time series for Draper Farm.

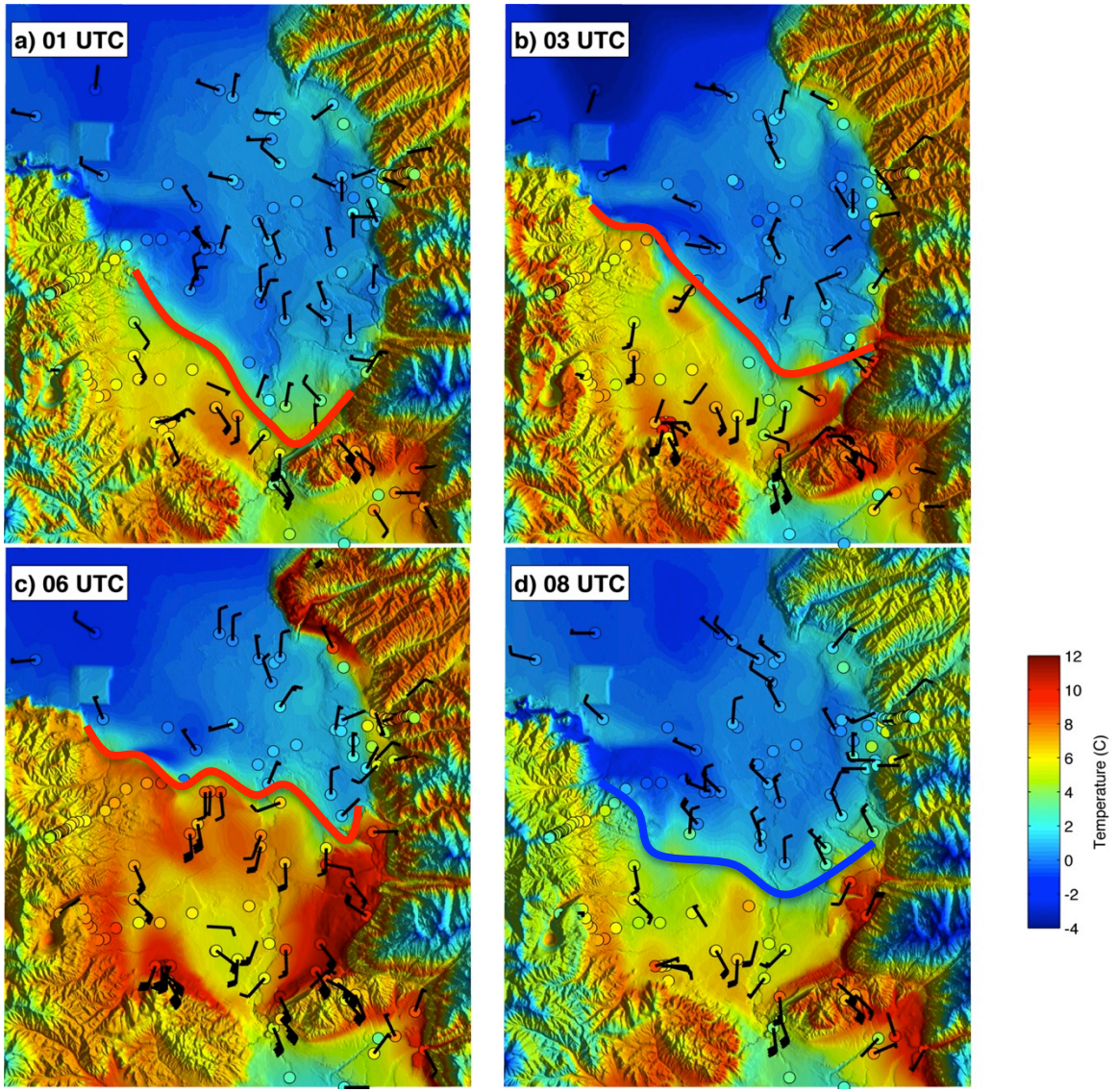

Figure 5. Surface temperature analysis (shading), surface observations (shaded dots), surface winds (windbarbs), and topography (shaded relief).

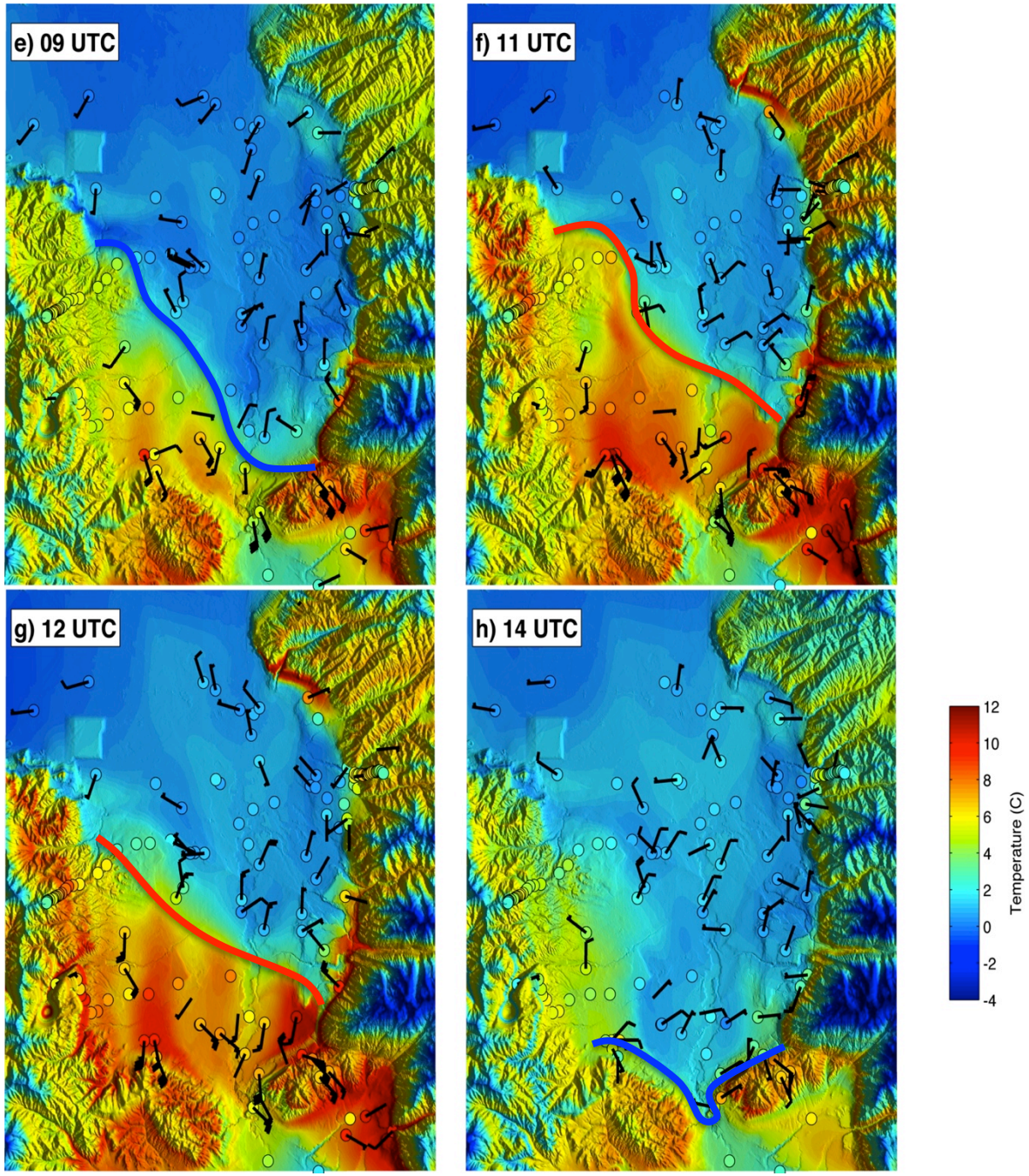

Figure 5 cont'd. Surface temperature analysis (shading), surface observations (shaded dots), surface winds (windbarbs), and topography (shaded relief).

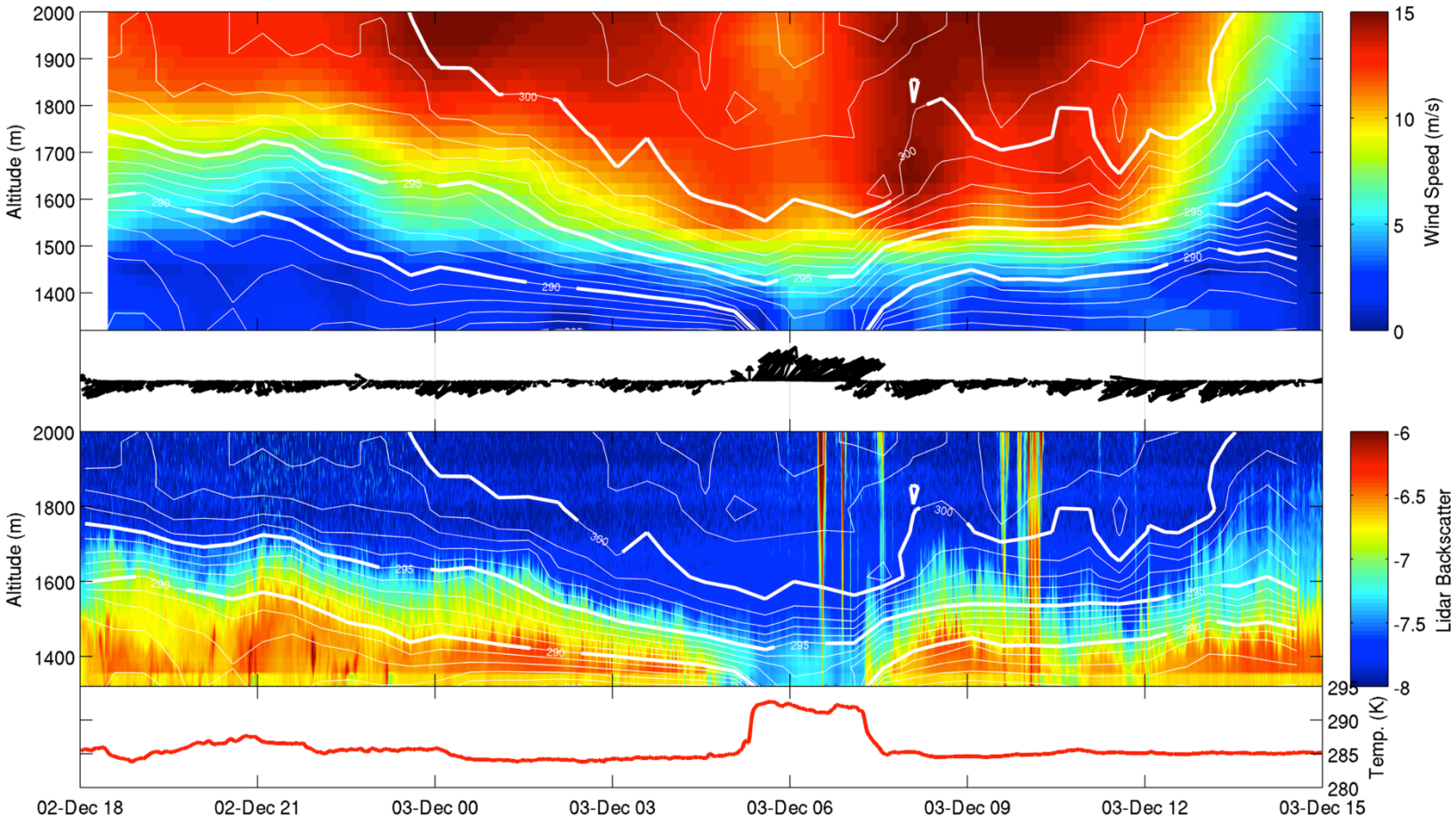

Figure 6. Time-height and surface meteorological data from NCAR ISS site. (a) Potential temperature (bold contours every 5K, light contours every 1 K) and wind speed (shading), (b) Vector winds at the surface, (c) potential temperature and laser ceilometer backscatter, and (d) surface temperature.

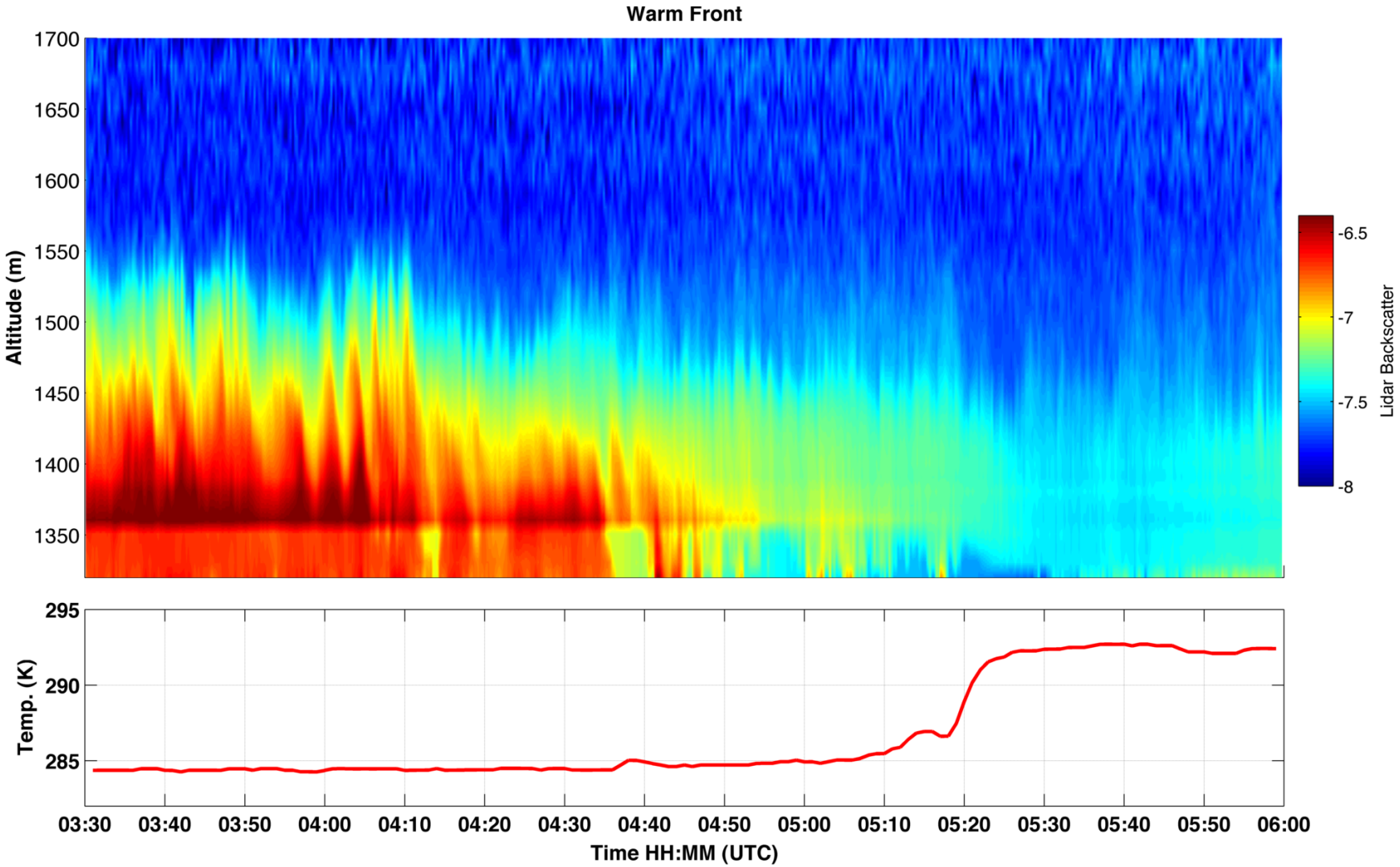

Figure 7. Warm frontal passage at ISS. (a) Laser ceilometer backscatter, and (b) surface temperature.

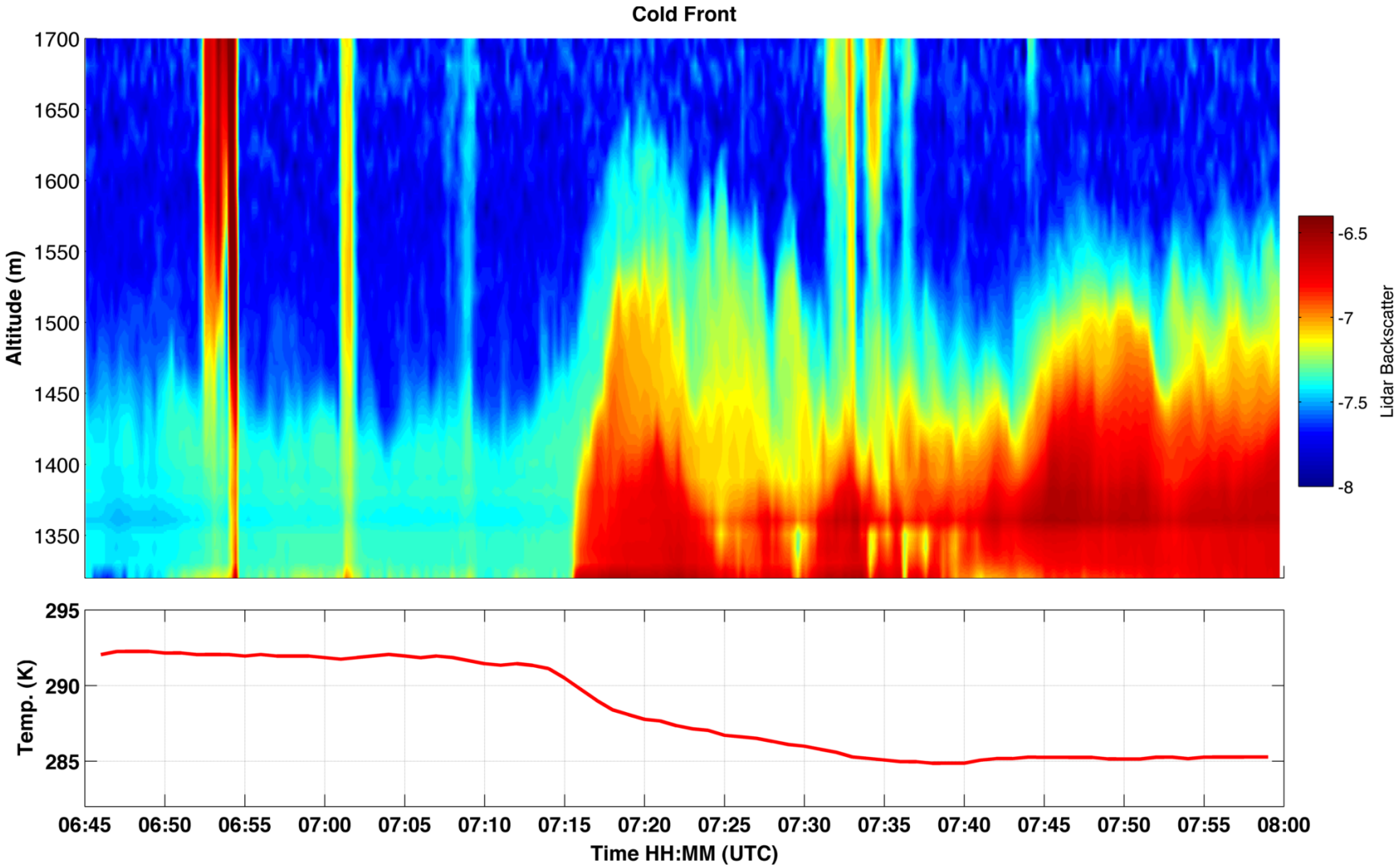

Figure 8. Cold frontal passage at ISS. (a) Laser ceilometer backscatter, and (b) surface temperature

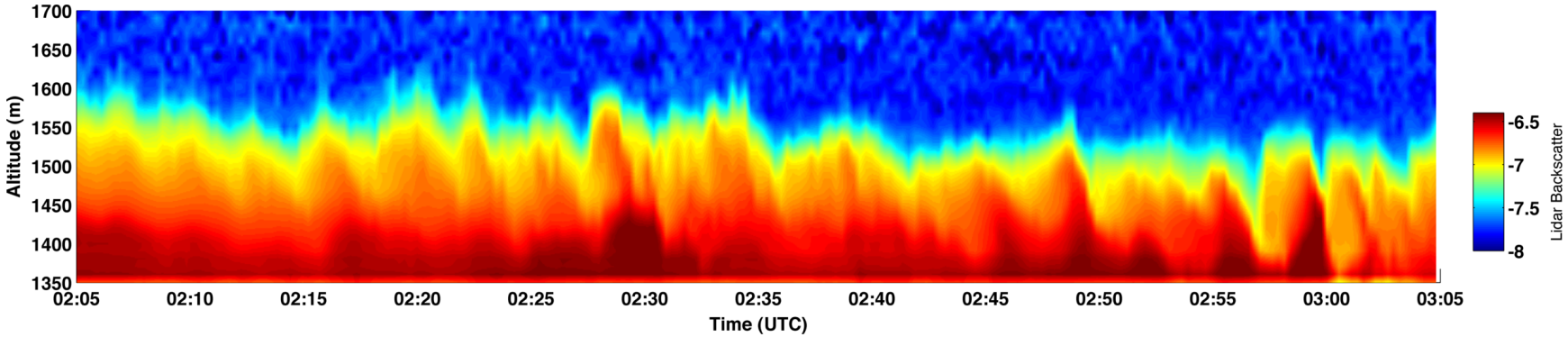

Figure 9. Laser ceilometer backscatter showing Kelvin-Helmoltz waves.

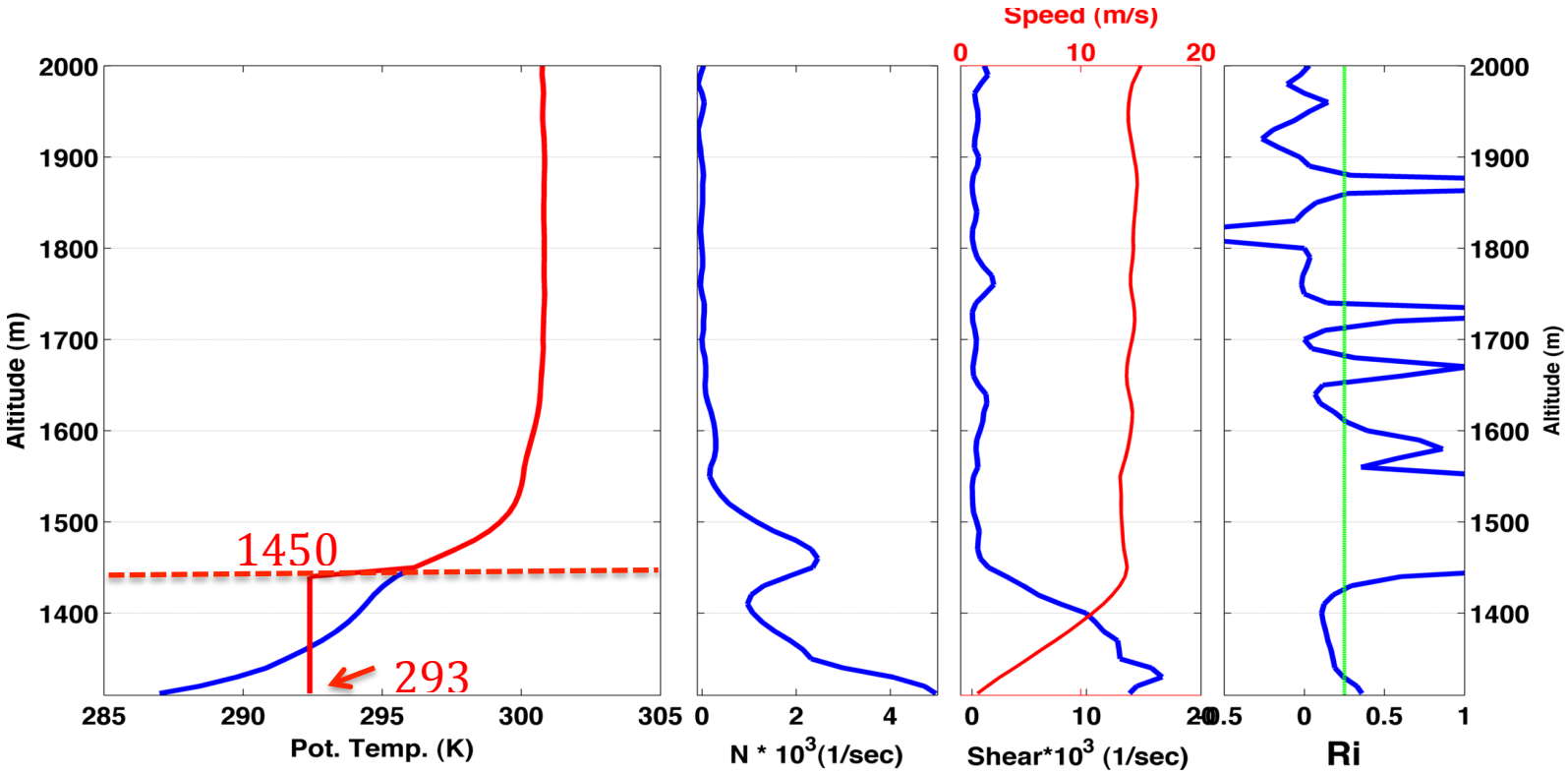

Figure 10. Sounding data from 05:14 UTC at the NCAR ISS site. (a) Observed potential temperature (blue) and predicted mixed profile (red), (b) Brunt-Viasal Frequency, (c) wind shear (blue) and speed (red), and (d) gradient Richardson number.

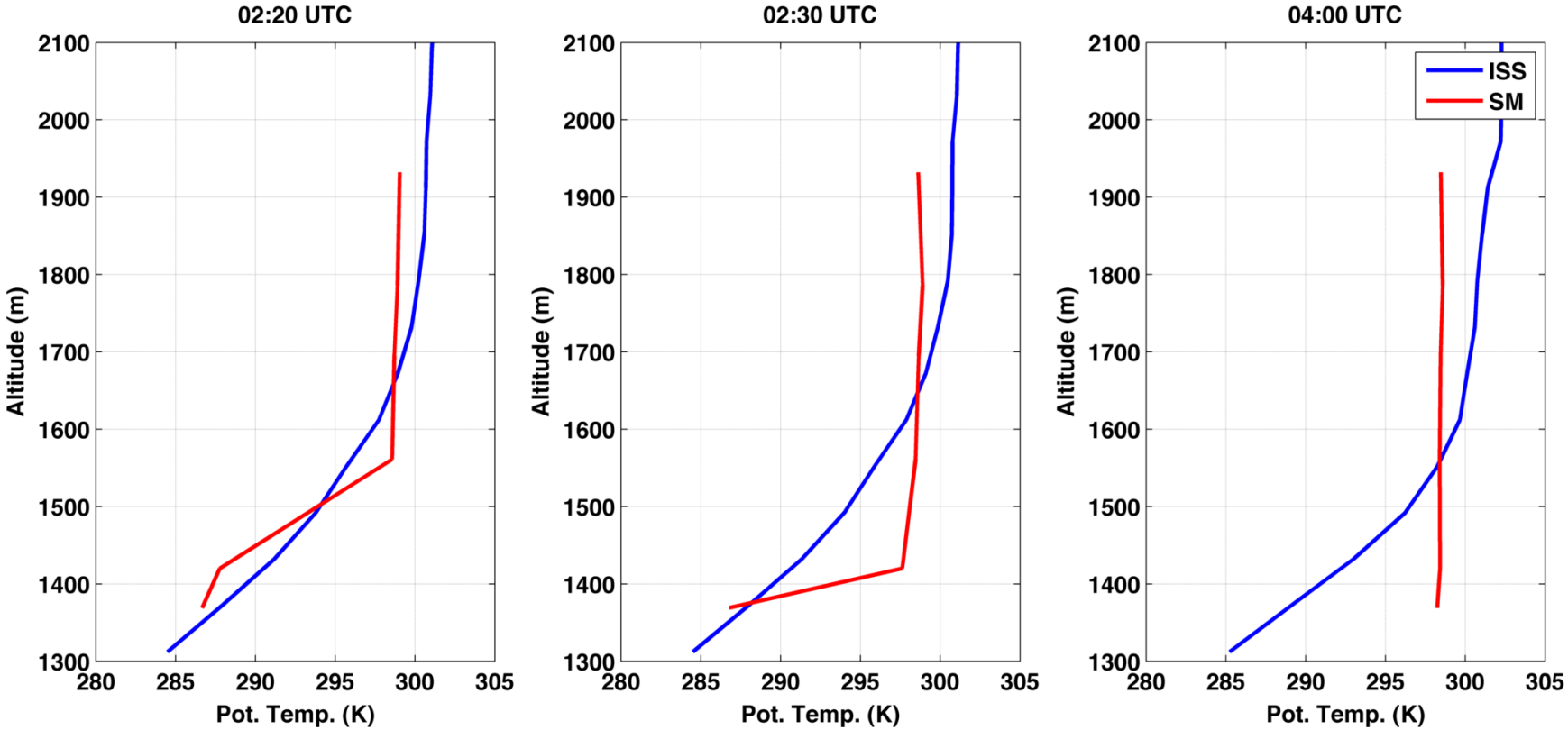

Figure 11 . Evidence of a mountain wave over the Traverse Ridge. Red line is the pseudo-sounding from surface stations ascending South Mountain and the blue line is the potential temperature profile at NCAR-ISS.

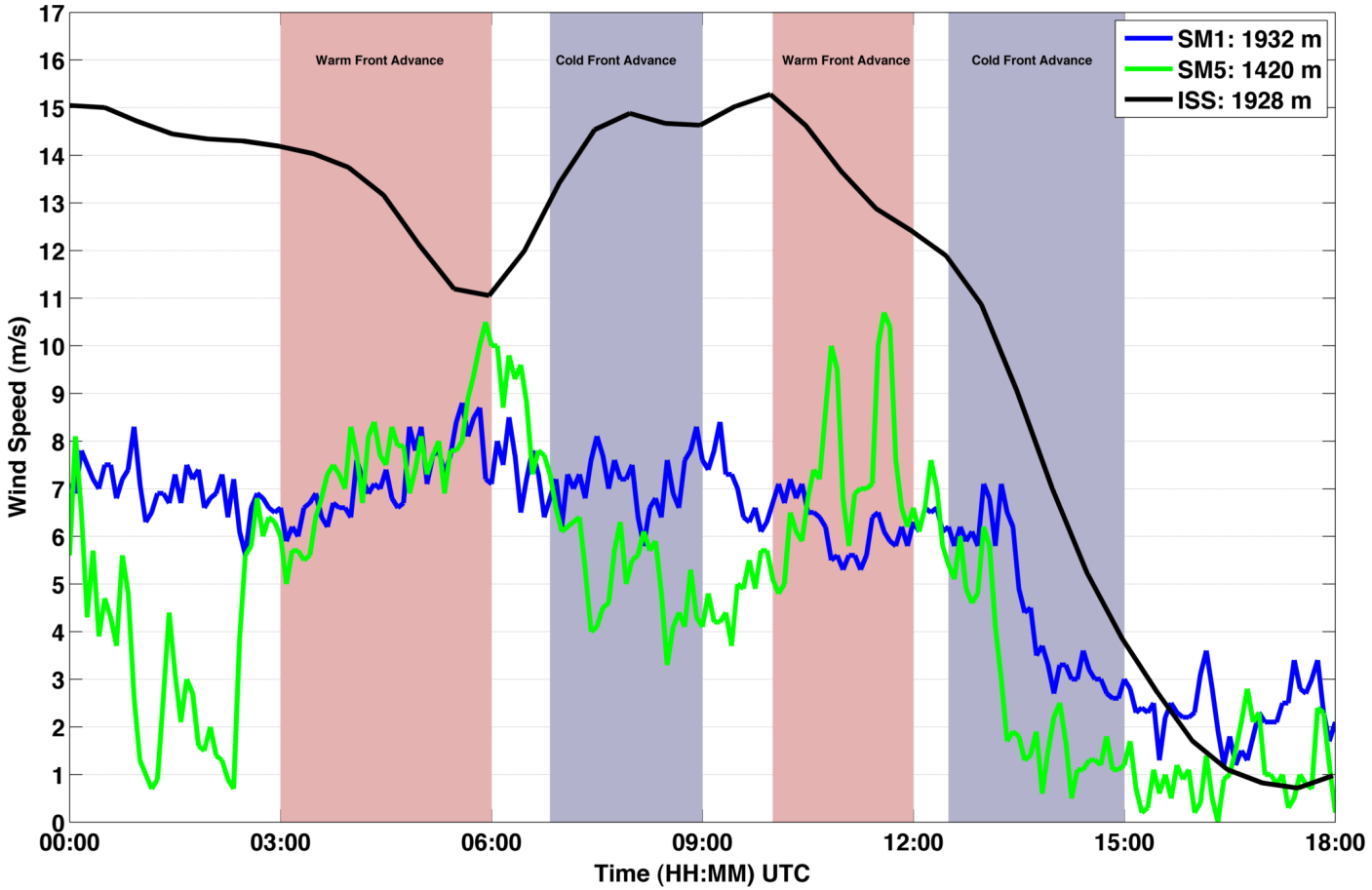

Figure 12. Wind speed for the top most (blue) and bottom most (green) surface stations along the South Mountain transect and the winds aloft at NCAR-ISS (black). Shaded regions indicate warm frontal advance (red) and cold frontal advance (blue).

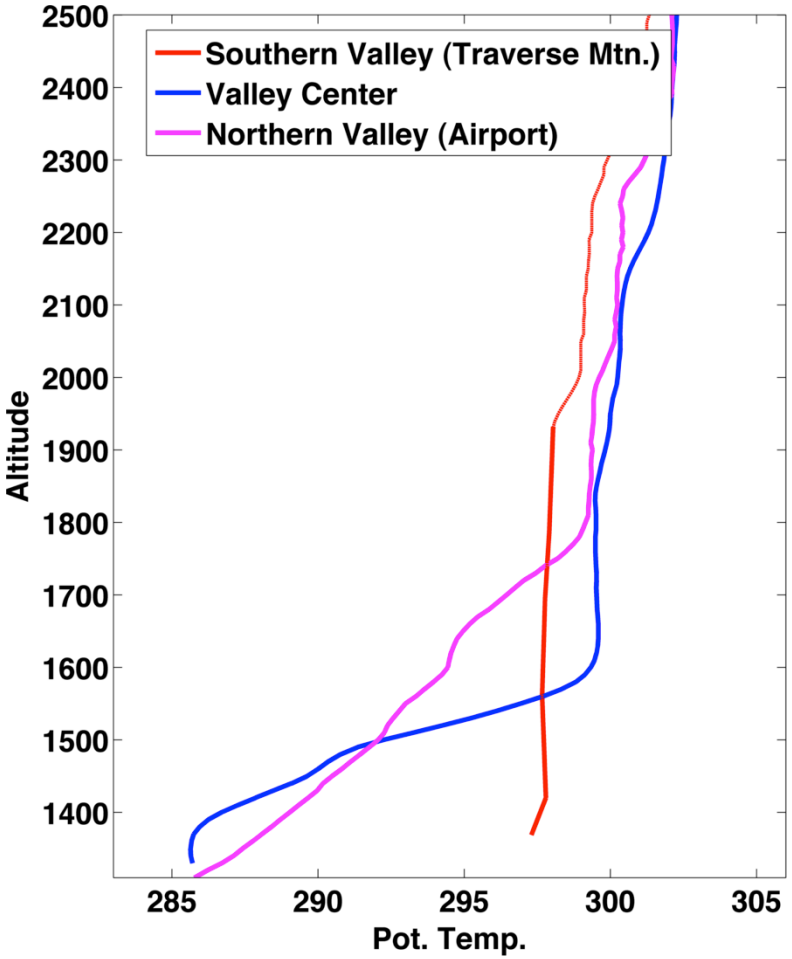

Figure 13. Evidence of a sloping CAP. Potential temperature profiles at ~11 UTC 3 December for the Traverse Ridge (red), NCAR ISS (blue), and Salt Lake International Airport (magenta).

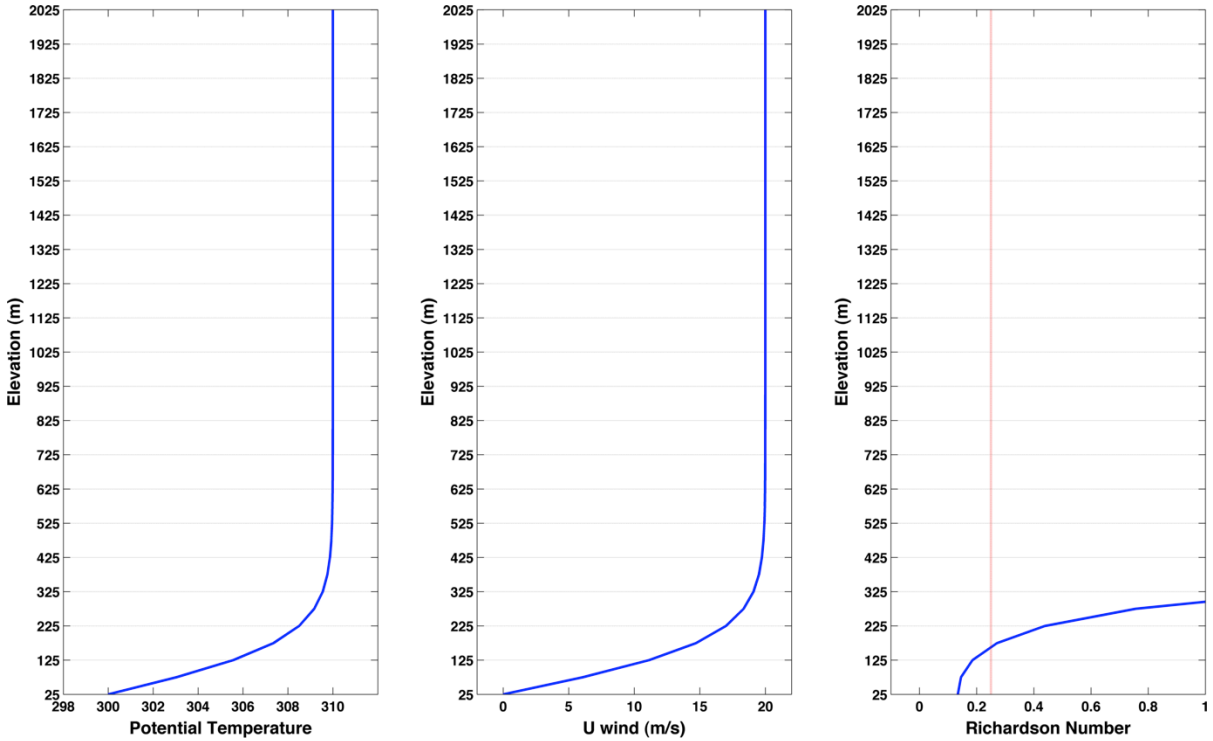

Figure 14. Idealized profiles used for WRF LES initialization.

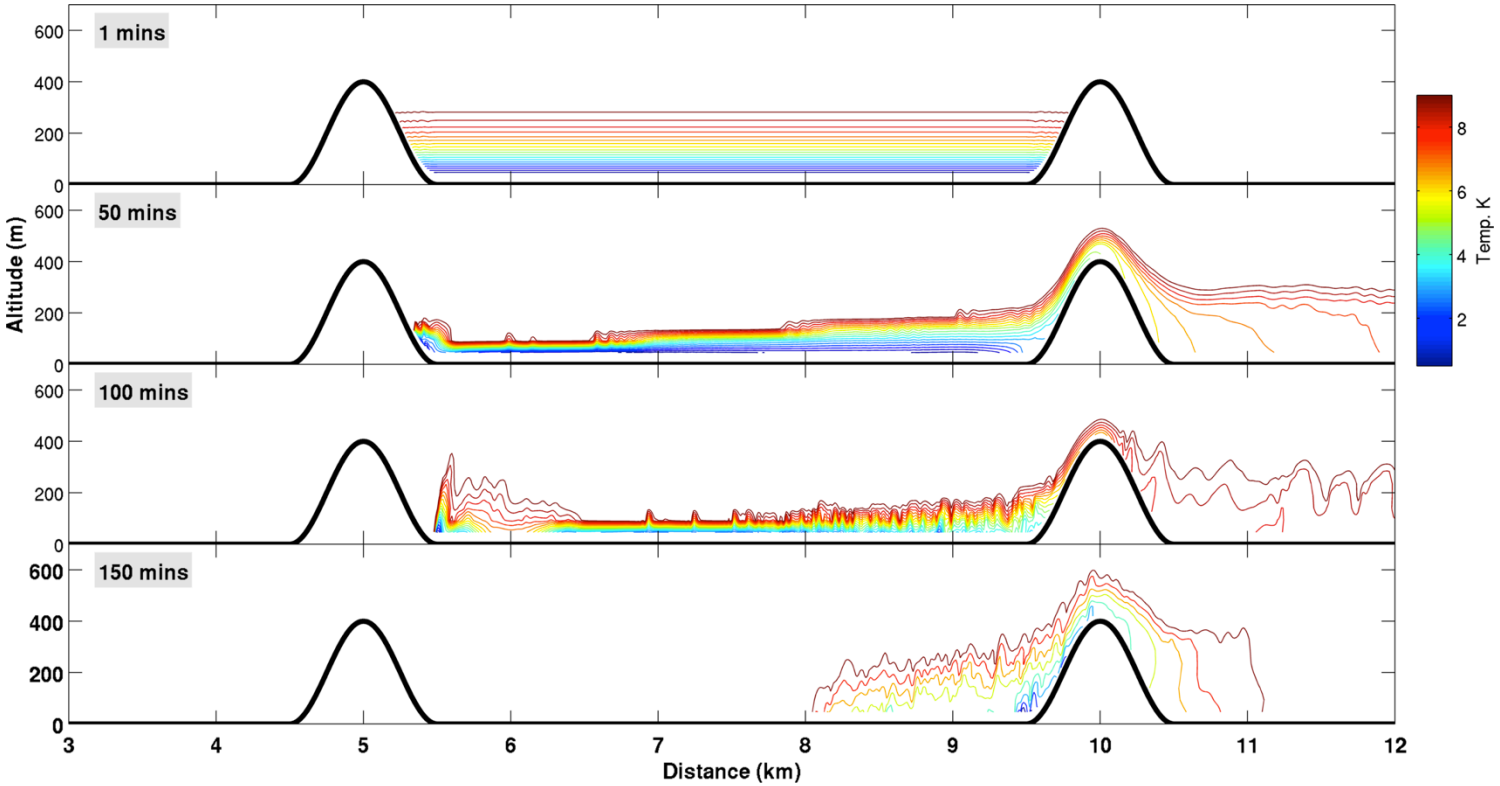

Figure 15. WRF prototype initialization (a) and results (b-d). Solid black line shows the topography, while colored contours (c.i. .5 K) show the CAP structure.

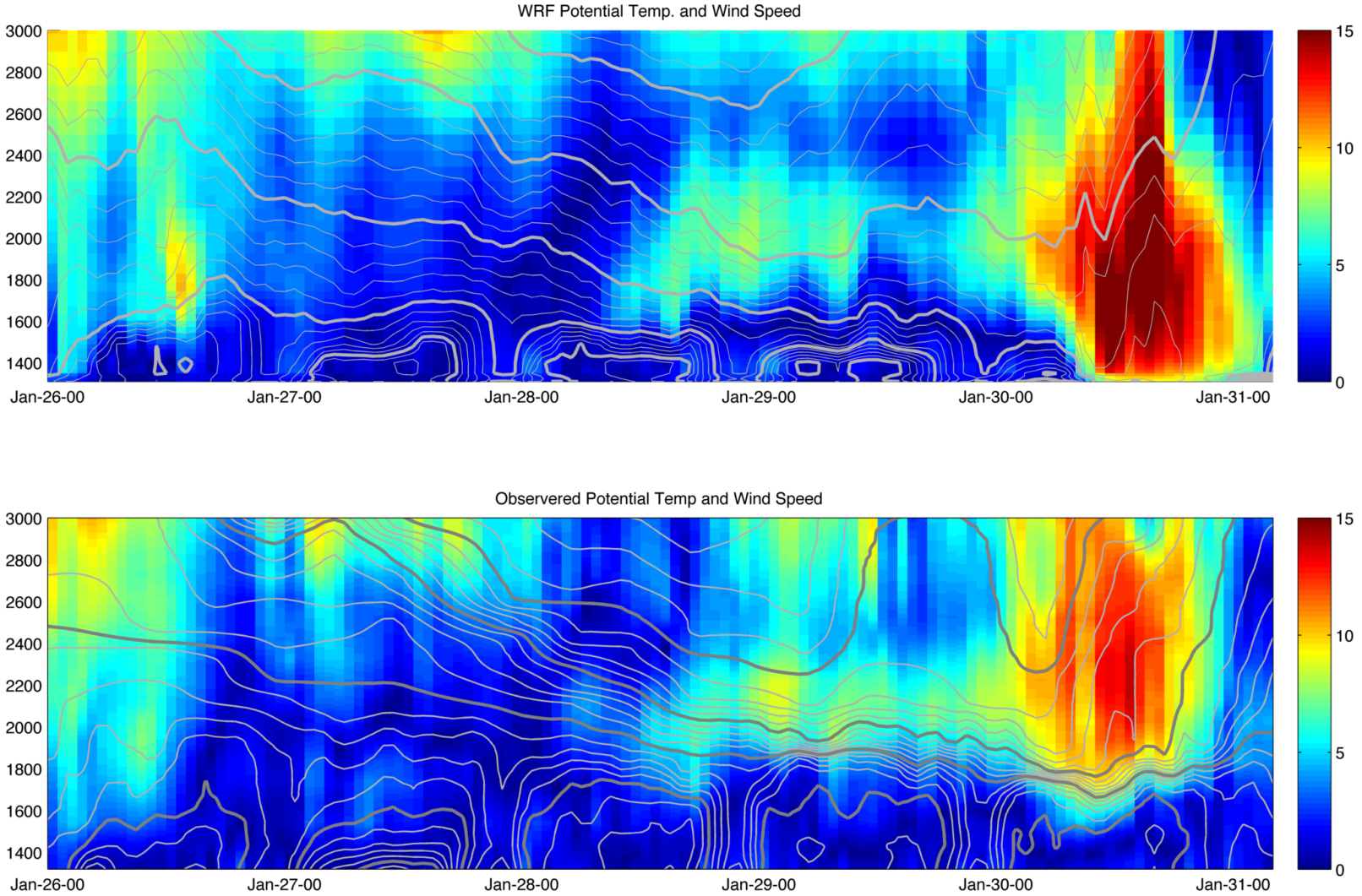

Figure 16. PCAPS IOP-9 potential temperature (contours) and wind speed (shading) for (a) 1.35 km WRF simulation, and (b) NCAR-ISS observations.