4.4 USE OF THE IFPS IN WESTERN REGION OF THE NATIONAL WEATHER

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1. Introduction

Producing gridded forecasts in complex terrain poses special challenges and opportunities. Weather can vary dramatically across the western United States due to terrain. The National Weather Service (NWS) is implementing an Interactive Forecast Preparation System (IFPS) to produce grids of forecast sensible weather elements. This paper will highlight some of the on-going work at NWS Western Region.

2. Terraln and Weather Elements

During a typical winter storm event, it is not uncommon for rain to be falling in the valleys, light snow falling in the foothills, and heavy snow in the higher mountain elevations. Precipitation amounts can vary by an order of magnitude within 10 to 20 miles due to effect of complex terrain. Figure 1 shows the average annual preciptiation for the state of Idaho. The effects of terrain are obvoius with annual precipitation amounts over 60 inches falling over higher terrain (6,000 to 11,000 feet) in north central Idaho and less than 30 inches falling over the Snake River Valley (3,000 to 4,000 feet ASL). Similar correlations can been observed for all western states and for most forecast weather elements.

3.0 Resolution versus Terrain

One of the first challenges encountered was determining the best grid resolution to use to properly represent weather elements in complex terrain. To appreciate the challenge, compare how terrain appears at 20km resolution and 2.5 km resolution (Figures 2 and 3).

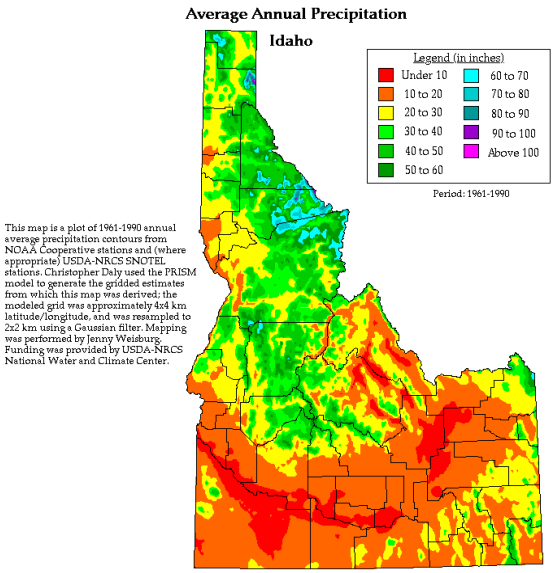

Figure 1: Average Annual Rainfall for Idaho

While it is obvious that 2.5 better represents the terrain, there are tradeoffs in terms of the required computational power to interactively edit the grids and the size of the files increases dramatically. After testing, the NWS has settled on an initial resolution of 5km, eventually migrating to 2.5 km grids.

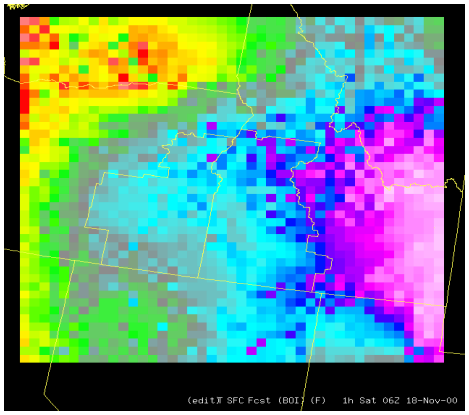

Figure 2 (20km resolution grid)

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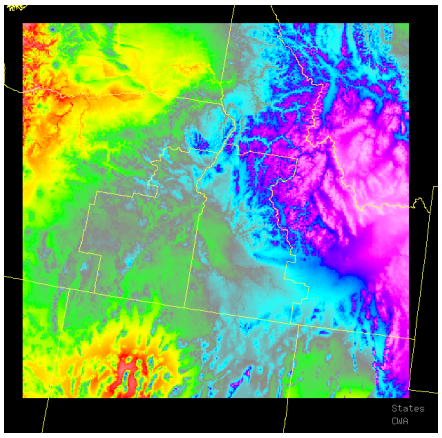

Figure 3 (2.5km resolution grid)

4.0 Some experimental Products and the RPP

Western Region has been participating in a project called the Rapid Prototyping Project (RPP). The purpose of the RPP is to explore how to use grids, and the resultant graphics to produce the standard NWS forecast products. Six Western Region sites plus Scientific Service Division (SSD) have been participating in the RPP for the last two years. The temperature forecast for northern Utah is an example of an experimental service product over complex terrain.

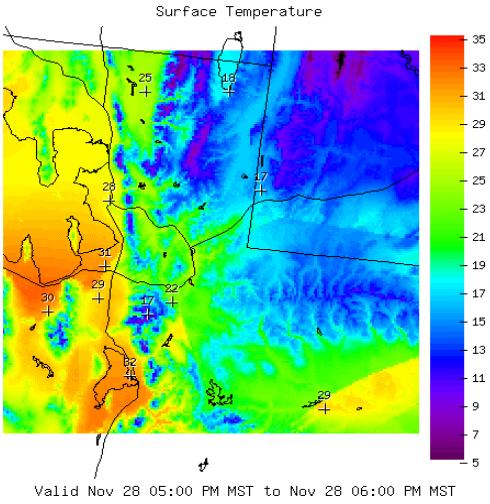

Figure 4 Temperature Forecast for northern Utah

Section 5: Monitoring and Verification

Another Western Region activity was to determine how to monitor and verify grids at the higher 2.5 to 5km resolution. A 5km version of ADAS (ARPS Data Assimilation System) developed at the University of Utah will be used for this purpose. The ADAS uses the 168 ASOS's in the west and incorporates the extensive MesoWest mesonet data developed by the University of Utah and the NWS WR . (Figures 5 and 6). At this time, up to 2,500 mesonet sites are available through Mesowest.

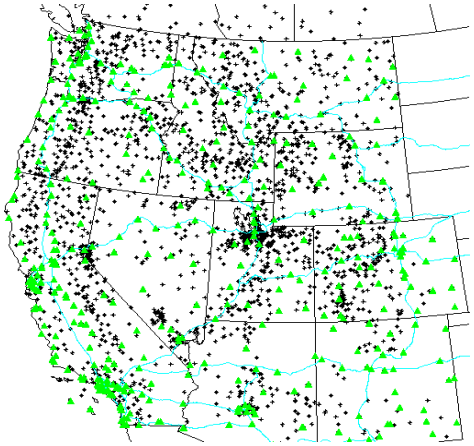

Figure 5: Mesowest mesonet sites

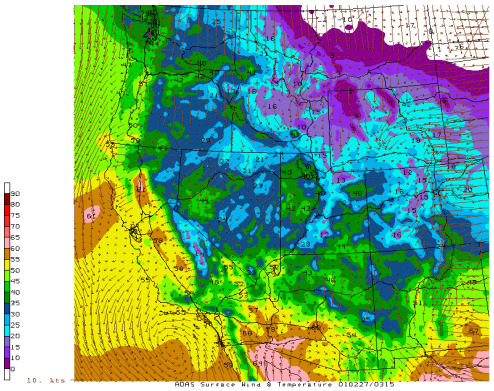

Figure 6: ADAS Temperature analysis

6. Summary

NWS WR has been exploring how to produce, monitor and verify forecast grids in the complex terrain of the west. The paper provides some brief insights into the work completed to date.