

"Snow front" as seen by the SLC KMTX WSR-88D

by Steve Vasiloff, NSSL/WRH-SSD

Introduction:

Following is a snapshot during the passage of a cold front over the Great Salt Lake as seen by the KMTX WSR-88D. Focus is on detectability of low-altitude wind phenomena with the radar located on a mountain. Also, precipitation accumulation by the PPS during a snow event is briefly discussed.

Data:

Radar reflectivity imagery shown in Fig. 1 is from the 0.5 deg tilt at 1928 UTC on 24 Jan. The 88D RDA is located on Promontory Point about 40 nmi NW of Salt Lake City. Promontory Point is the southern tip of one of many short N-S oriented mountain ranges in the Great Basin. The radar site is 6547 ft MSL and is about 2000 ft above the Salt Lake valley floor and half way down the Great Salt Lake (GSL) on its east side. The outline of the GSL is hard to see in the reflectivity image but clear in the other images. Also easier to see in Fig. 4 are the locations of Ogden (OGD), Salt Lake City (SLC), and Provo (PRV), which are all only 5-10 miles from the Wasatch mountain range to the east. Additional information about the image can be found in the lower part of the window.

The leading edge of a band of echo is oriented nearly east-west over the south half of the GSL, about 12 nmi from the radar. Brigham City (about 25 nmi NE of the radar) reported snow with NW winds gusting to 40 mph as the front passed. Winds ahead of the front were from the south at 10-15 mph.

Associated velocity data at 0.5 deg (Fig. 2) are shown at larger magnification. The frontal boundary can be seen just south of the radar as parallel lines of green and red. However, absent is the characteristic signature of a strong frontal passage at the surface. The reason is that the height of the 0.5 deg radar beam is approx. 2750 - 3000 ft above the valley floor and surface wind shift line.

The 1.5 deg velocity image is shown in Fig. 3. The signature indicates divergence above the front. (The height of the beam is about 4250 ft at the range of the front.)

Fig. 4 shows the 1-hr precip accumulation from the 88D PPS. The total is very low owing to the fact that the precip is falling as snow. (Surface measurements are needed to verify actual amounts.)

Conclusions:

The position of the KMTX WSR-88D prevents detection of shallow surface wind-related phenomena, even at relatively close ranges.

Figure 1

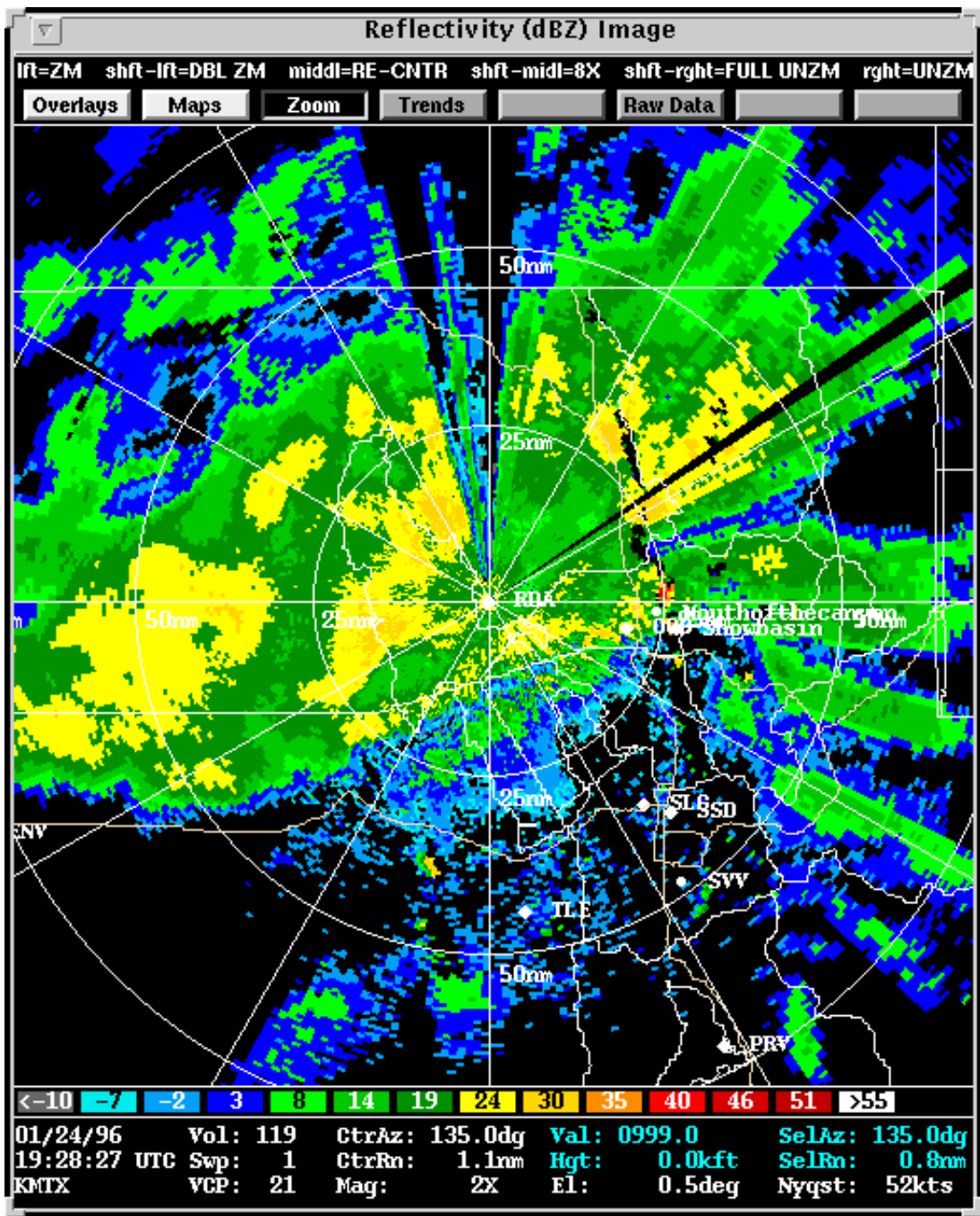


Figure 2

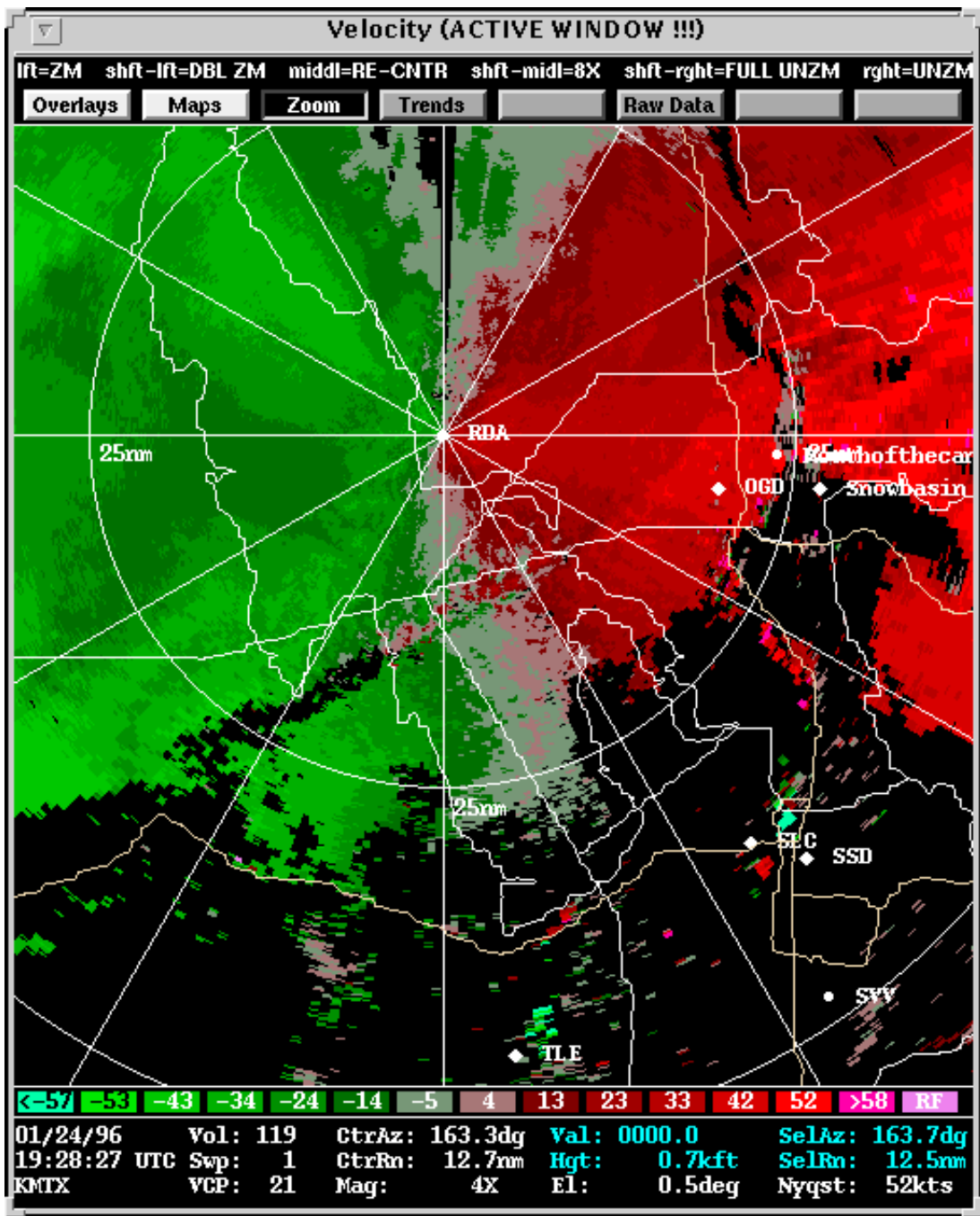
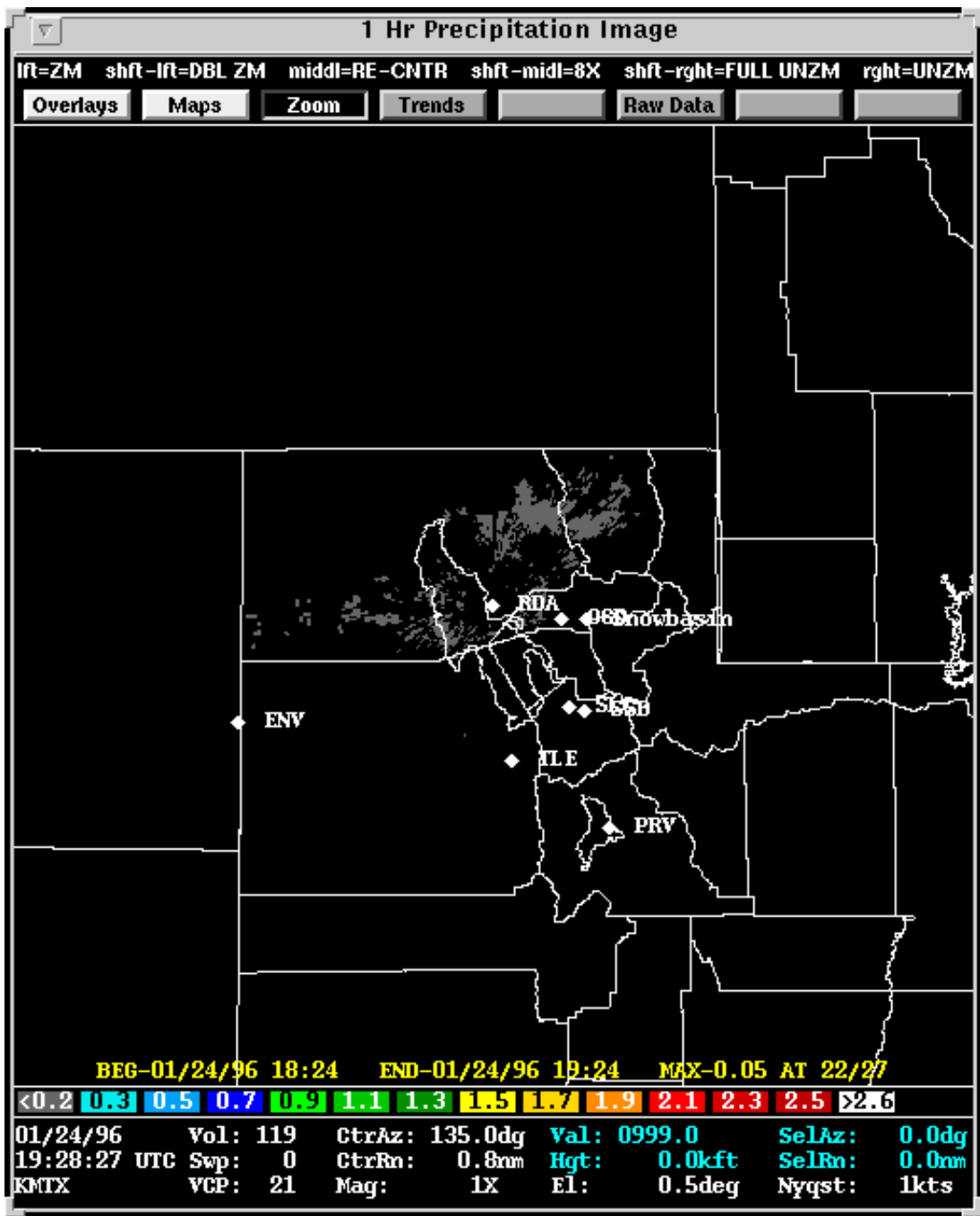


Figure 3



steven.vasiloff@noaa.gov