Abstract

The distribution and frequency of fog events during the cold season in northern Utah is studied using surface Mesowest data from 2004 to 2014. Fog is identified using the reported weather conditions, relative humidity, and visibility. The length and time of each fog occurrence is calculated. Statistics are performed on daily, monthly and seasonal timescales. In order to ensure representativeness of the data and to account for the relatively small sample size available, "near fog" conditions are accounted for in some statistics.

Results show that there is significant variability among the valleys in northern Utah in terms of both quantity and timing of fog events. Locations close to lakes such as the Great Salt Lake or Utah Lake are foggier than locations further away. It is also noted that small, enclosed valleys have higher amounts of fog than locations in more broad, open valleys. Throughout the region there is a distinct peak in fog in late January for most stations. Similarly, a strong peak in fog occurrences near dawn is also found for all cold season months.

In addition, the influence of local, mesoscale conditions on the fog distribution are evident in many stations. It was found that the existence of fog at one location was a very poor predictor of fog for nearby locations on daily time scales, which implies serious forecasting difficulties over complex terrain. However, it was also found that on annual time scales the amount of fog at one location could be used to estimate the amount of fog at another location. The controlling factors that contribute to the variability of fog events over northern Utah (a mountainous region) are discussed.