Colorado Alpine Dust Deposition and Associated Continental Winds

Morgan Phillips
Colorado Climate Center and Bureau of Land Management

Abstract. The winter and early spring of 2008-2009 brought an unusually high number of alpine dust deposition events to the Rocky Mountains of Colorado. The greatest dust accumulations were observed in the San Juan Mountains of southwestern Colorado. Significant dust accumulation was even observed along the Continental Divide in northern Colorado. The primary source for this dust has previously been identified as the Colorado Plateau. Analysis using the HYSPLIT(Hybrid Single Particle Lagrangian Integrated Trajectory) atmospheric trajectory model along with satellite imagery showed that dust from the 2009 events also originated from the Colorado Plateau, especially from areas in and around northeastern Arizona that were experiencing drought conditions this spring.

This study utilized data from the USFS/BLM RAWS (Remote Automated Weather Station) network over the southwestern U.S. to identify periods of high winds corresponding to documented Colorado dust events. Wind speeds for the study region were evaluated for the period January through April for the past 20 years in an attempt to quantify and compare both mean wind speed and maximum wind gusts on a seasonal basis. A linear regression analysis showed a significant correlation between the Southern Oscillation Index (SOI) and the frequency of these types of high wind periods, particularly during winter months. The correlation between periods of high winds and the SOI extends through the 20 years of wind data available for these weather stations.