Colorado Dust-on-Snow Program – Water Year 2012

Update #1 - Thursday, March 1, 2012

March 1st greetings from the Colorado Dust-on-Snow Program (CODOS) and the Center for Snow and Avalanche Studies (CSAS). CSAS wishes to thank the Colorado water management community for your continued support of CODOS and ongoing monitoring of dust-on-snow at our Senator Beck Basin Study Area at Red Mountain Pass, and at ten additional sites throughout the Colorado mountains. This season CODOS will continue to issue occasional general Updates and Alerts to the community at-large. We will also attempt to provide, 'on the fly', more locale-specific reports during our statewide field sessions, providing more timely and detailed information.

As previously reported, we've observed three early winter dust-on-snow events this season at our Senator Beck Basin Study Area at Red Mountain Pass - on November 5th, November 13th, and December 31st. Of those, the latter two were extremely minor events, only briefly and barely visible in the snowpack at our Swamp Angel Study Plot, our 'baseline' monitoring site for CODOS. The November 5th (D1-WY2012) event remains visible in our snowpits, but is very near the ground surface and will play a very minor role in spring snowmelt. No additional dust-on-snow has been observed by us at the Swamp Angel Study Plot since December 31st, and we've received only one report of dust in the snowpack elsewhere in the state, a report from a Colorado Avalanche Information Center colleague of two well-buried January layers in the Dolores River watershed.

While wind is just one among many interacting factors that result in Colorado Plateau dust deposition onto the Colorado mountain system, it is a critical ingredient that we can accurately monitor at Senator Beck Basin. In past Updates we've reported on (direction-less) "miles of wind" measured at our Putney Study Plot, a ridgetop site well suited to measuring wind with minimized terrain influences. As seen in Figure 1 (below) the winter of 2011/2012 is lagging behind previous winters despite a fairly windy November (with two dust events), and an extra day in February.

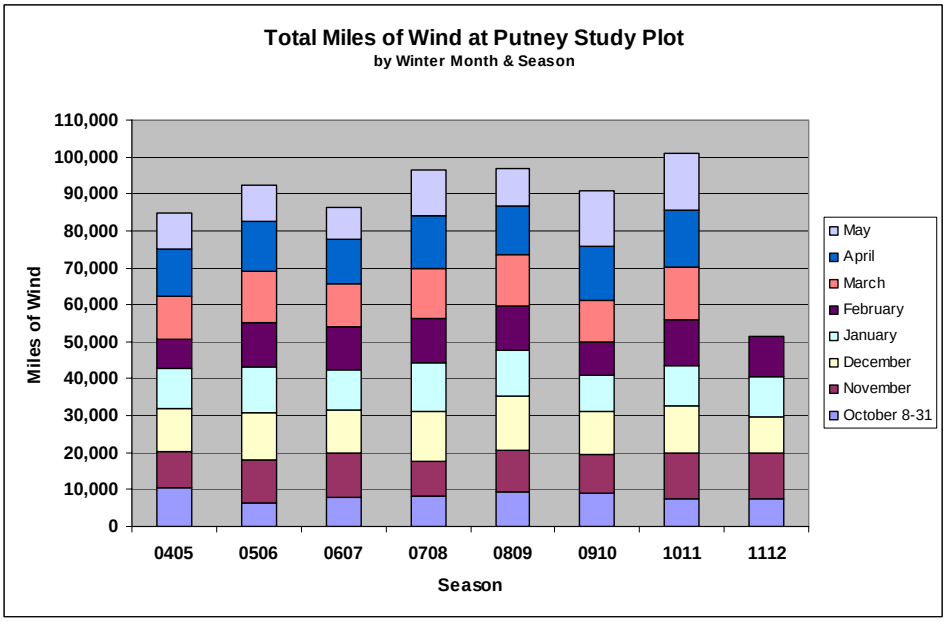

Figure 1: Miles of Wind at Putney Study Plot, Senator Beck Basin Study Area, by month and season.

A more detailed look at Putney data reveals notable differences between this February 2012 and February 2011 that, in part, could explain the absence of dust with recent strong wind events (Figure 2). February 2011, which averaged 18.1 mph for the month, produced a larger proportion of hourly average speeds in the 22-45 mph (red) category than February 2012, which averaged 12.4 mph for the month. Further, a much larger percentage of higher wind speed episodes in 2011 were from the 180-270 degree quadrant; 2012 data show the largest share of 22-45 mph winds from the 270-360 quadrant. Plots of Putney wind data during past dust storms show that dust-on-snow deposition at Senator Beck Basin is most often associated with strong S'ly and SW'ly winds of 22-45 mph or higher. February 2011 did produce one dust-on-snow event, on February 19th, associated with wind speeds exceeding 45 mph (shown in black). CODOS will continue these wind analyses.

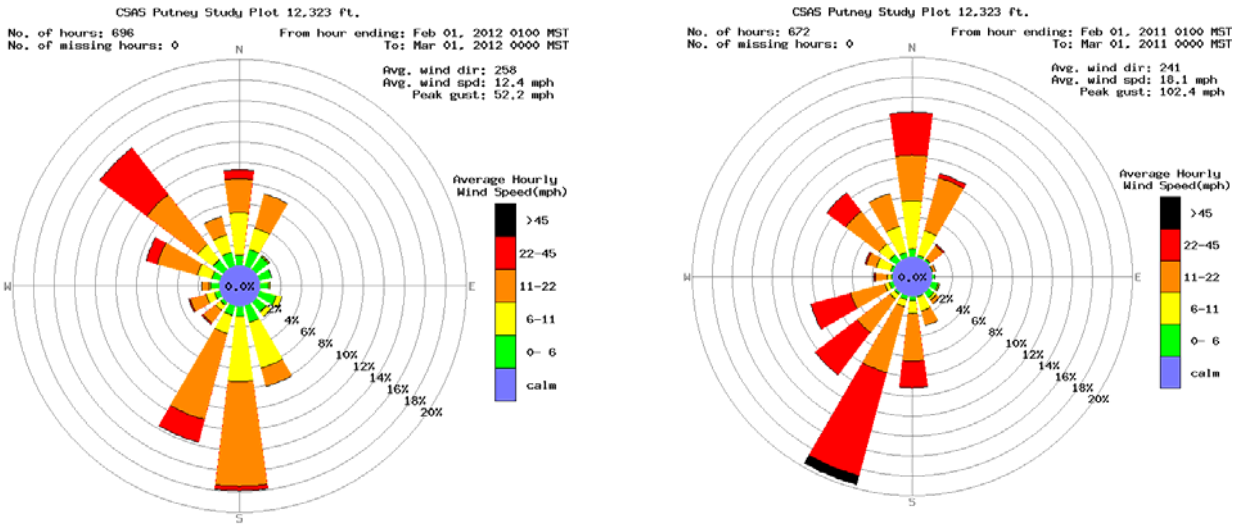

Figure 2: Wind rose graphs showing the distribution of hourly average wind speeds and directions for the months of February 2012 (left) and February 2011(right). (Best viewed at 150%).

However, by themselves, wind speed and direction are not reliable predictors of dust-on-snow deposition here at Senator Beck Basin. Soil conditions in the Colorado Plateau source areas must also favor mobilization of loose soils by wind. While Colorado Plateau soil and weather data are sparse, still images from new automated cameras installed by the U.S. Geologic Survey at three sites – Mesa Verde NP, Abajo Peak, and Canyonlands NP – are intended to capture dust in the atmosphere and document reductions in visibility. Each of these cameras views a large landscape with distant landmarks visible on a clear day. Links to these webcams are available on the USGS's website at: http://gec.cr.usgs.gov/info/regional_cams/

As of this writing, we're experiencing a significant winter storm (our Storm #18) adding welcome SWE to the San Juan Mountain snowpack and to other ranges throughout the state. CSAS's CODOS program staff will conduct our first 1,200 mile "baseline" tour of our ten CODOS sites later in March or in early April, as dust-on-snow events dictate.

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