

AIEEEE!! La Niña!!!

by Mark Moore, NWAC, October, 2007

Much like last year when thoughts of El Niño resulted in discomfort for some and dire predictions for an abominable snow year by others, the onset of what is being termed a “strengthening weak to moderate” La Niña may have some folks wondering exactly what snowpack ramifications might be for this “cold” phase of ENSO (El Niño Southern Oscillation). Weather climatologists who dwell in the land of long range predictions wish there was an easy and clear-cut answer to this question. Fortunately the latest update (October 11, 2007) from the [ENSO web site](#) provides some insight into this phenomenon through the following broad brush summary:

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

issued by

CLIMATE PREDICTION CENTER/NCEP/NWS

11 October 2007

Synopsis: La Niña will likely continue into early 2008.

La Niña conditions strengthened during September 2007, as negative SST anomalies along the equator expanded westward and now extend from 170°E to the South American coast (Fig. 1). The latest weekly analysis (Fig. 2) shows the largest SST departures (-2°C to -3°C) between 120°W and the coast, with departures of -0.5°C to -1°C centered near the date line. The magnitude of the negative SST anomalies increased in all of the Niño regions, with the Niño-3.4 index dropping to -1.2°C and the Niño-4 index dropping to -0.5°C by the end of the month (Fig. 3). The upper-ocean heat content (average temperatures in the upper 300 m of the ocean) in the central and east-central equatorial Pacific remained below average during September (Fig. 4), with temperatures ranging from 2°C to 4°C below average at thermocline depth (Fig. 5). Consistent with these conditions, the low-level easterly winds and upper-level westerly winds remained stronger than average across the central equatorial Pacific, convection remained suppressed throughout the central and eastern equatorial Pacific, and enhanced convection again covered parts of Indonesia and the far western Pacific. Collectively, these oceanic and atmospheric conditions reflect a strengthening La Niña.

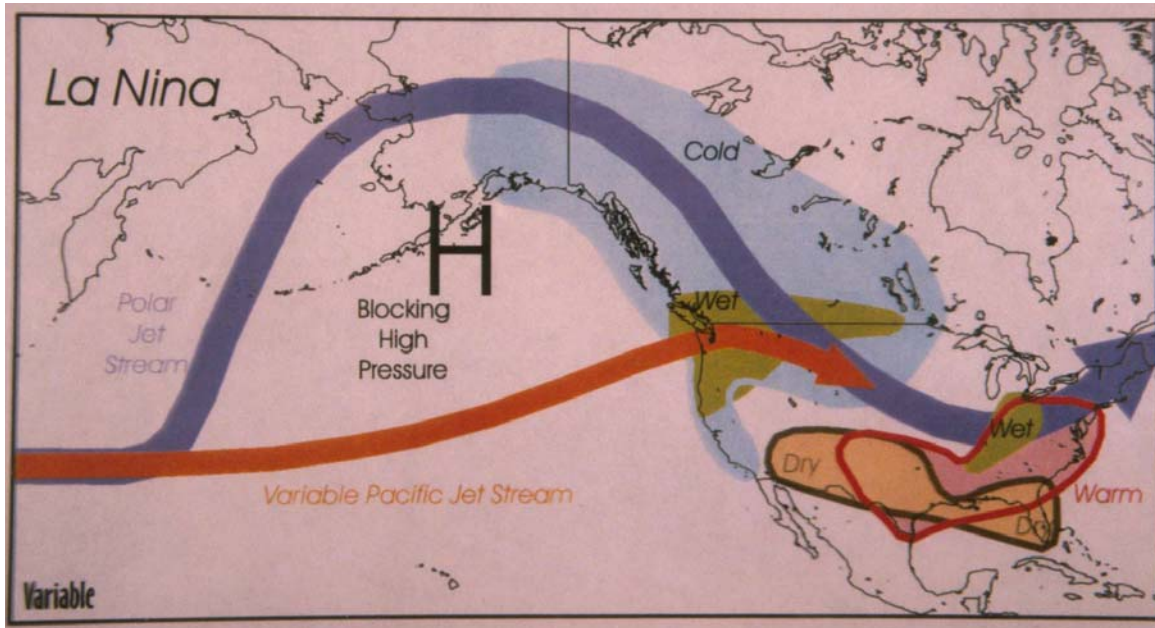
The recent SST forecasts (dynamical and statistical models) for the Niño 3.4 region indicate a weak-to-moderate La Niña continuing into early 2008 (Fig. 6). Current atmospheric and oceanic conditions and recent trends indicate that La Niña will continue and may strengthen during the next 3 months.

Expected La Niña impacts during October – December include a continuation of above-average precipitation over Indonesia and below-average precipitation over the central equatorial Pacific. For the contiguous United States, potential impacts include above average precipitation in the Pacific Northwest, and continued below average precipitation in the Southwest.

Summarizing the above at this juncture of the currently developing La Niña:

- **La Niña is present across the tropical Pacific.**
- **SST anomalies have become increasingly negative in the east-central equatorial Pacific.**
- **Nearly all dynamical and statistical models predict La Niña persisting through early 2008.**
- **Recent equatorial Pacific SST trends and model forecasts indicate La Niña will continue and may strengthen during the next several months.**

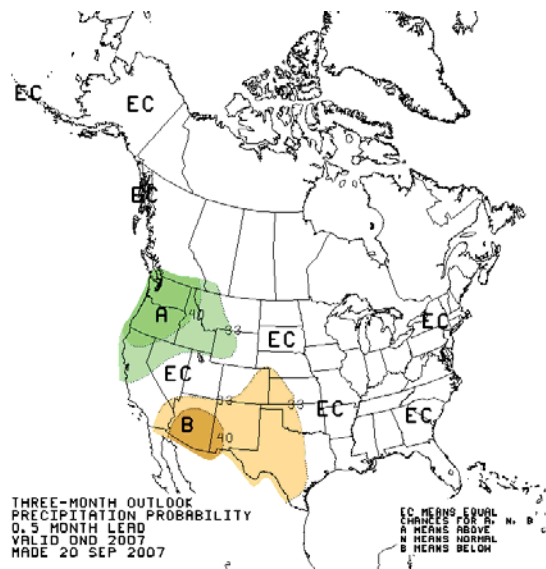
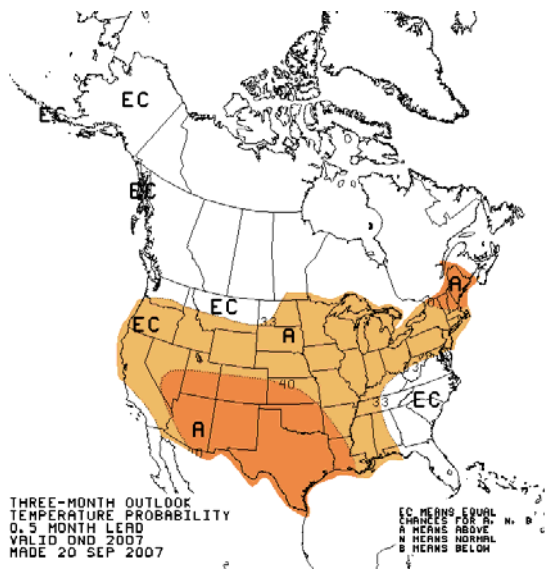
The above yellow highlighted impacts on the United States can be more completely understood by the expected average positions of the polar/Pacific jetstream during such an event.



When the jetstream lies along the lower (red) track shown above, gloriously rainy/snowy Northwest weather brings delight to both woodland creatures and lovers of Cascade crud. However, when a blocking upper ridge graces the Gulf of Alaska as in the blue flow pattern above, the resulting north to northwesterly path of the jetstream brings cooler and generally drier weather to the region. When the warmer and wetter pattern in red follows the colder pattern in blue, the NW mountains can and do experience some rapid temperature fluctuations that result in dramatically changing and high to extreme avalanche danger (cold, lower density snow or surface hoar followed by large and increasing density snowfall or rain).

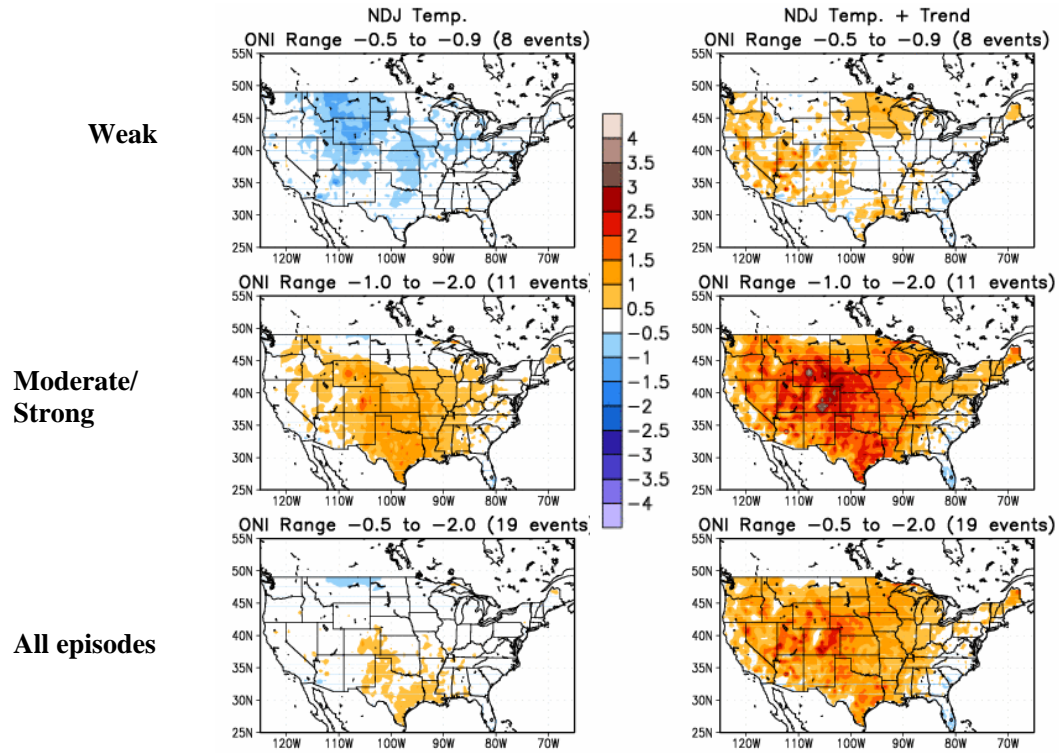
Hence overall (if one discounts the recent global warming trend which will be briefly discussed below), La Niña normally typically brings with it an increased chance for slightly wetter and cooler weather to the region. However, before you rejoice that “abundant powder will soon be yours for the taking”, we need to bring in a slightly more sobering scenario that considers the influence of La Niña combined with the overall slow global warming trend with which we are all aware. While late fall and early winter conditions still may exhibit (statistically) a slight bias toward wetter and colder conditions in the NW, this bias is shown to deteriorate to more normal (ENSO-neutral) or even slightly warmer than normal conditions as the winter progresses, especially if one considers a weak (or even a weak to moderate) La Niña combined with global warming. And how about precipitation-wise considering the combined La Niña/global warming trend? The effect for this combination may be to shift the heaviest 3 month average precipitation southward into Oregon and northern California, rather than keeping it centered from northern California through northern Washington. See the transition in expected three-month temperature and precipitation departures in the graphics below.

U. S. Seasonal Outlooks October - December 2007

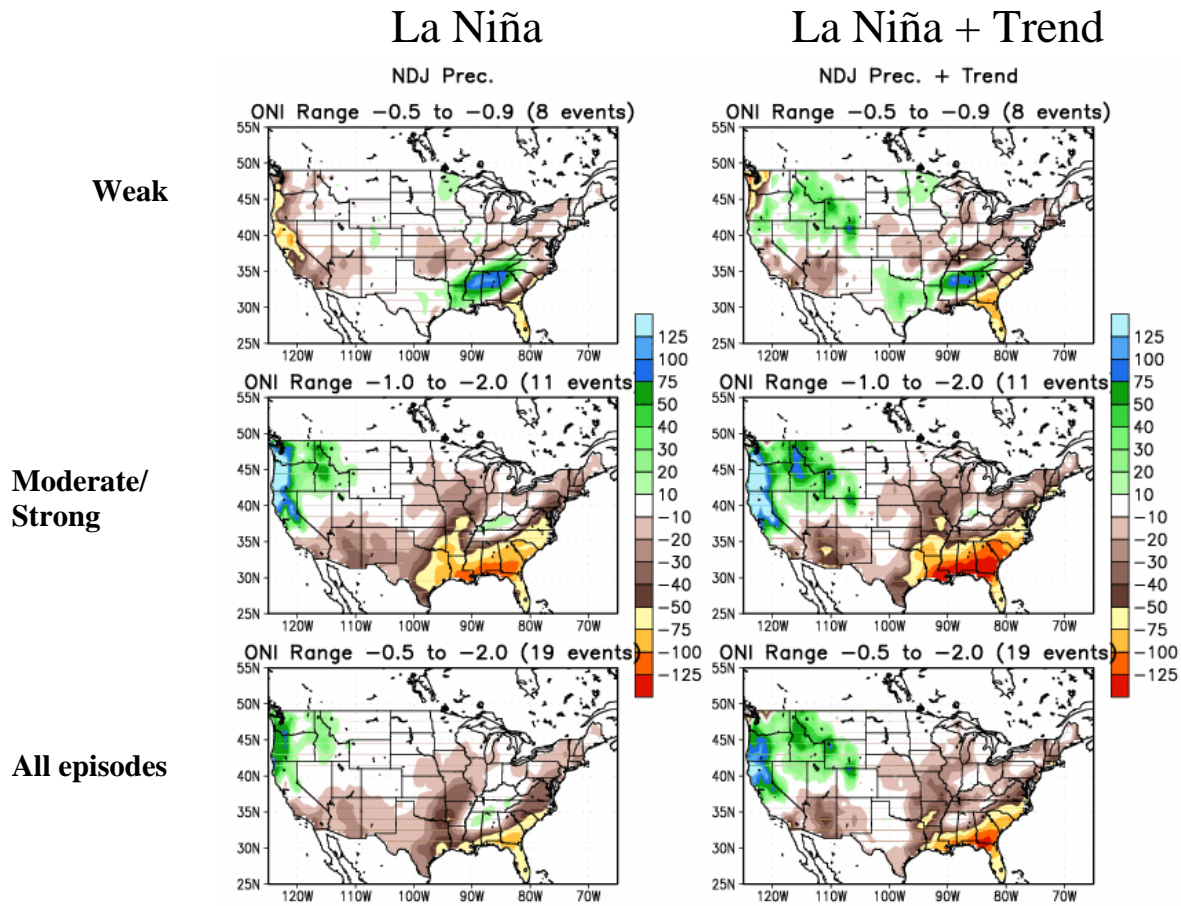


Note that the seasonal outlooks above combine typical La Niña impacts, along with long-term trends and soil-moisture effects.

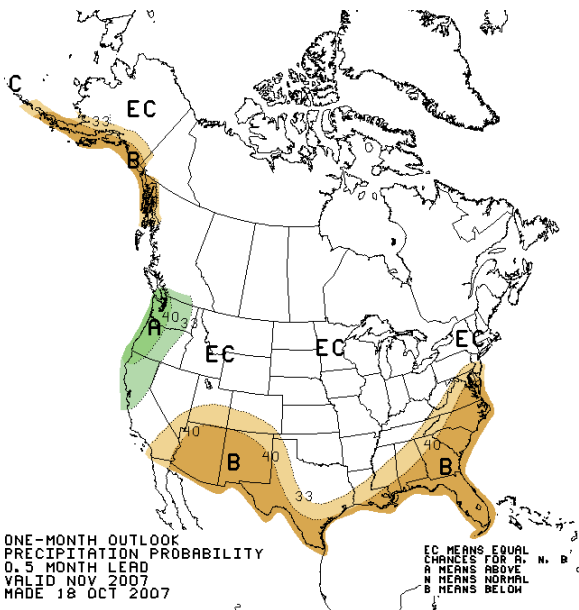
Temperature Departures (°C) for Ranges of the ONI during November-January



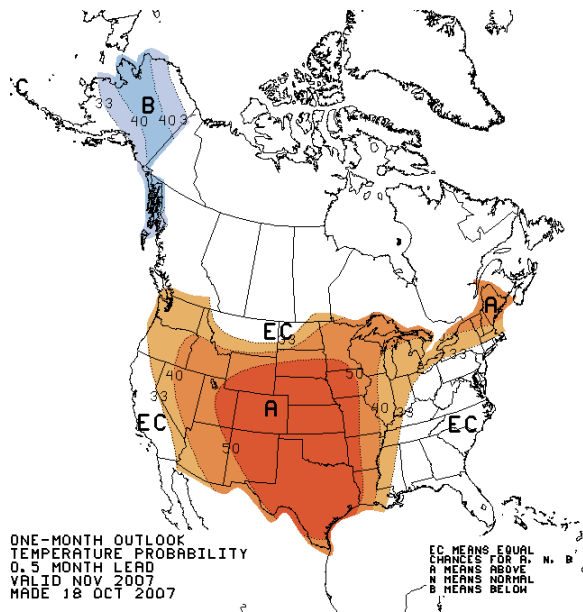
Precipitation Departures (mm) for Ranges of the ONI during November-January



So, in the end what does all of this say about the upcoming winter season? Well, as any good long range forecaster will tell you, it depends. It depends on the ultimate strength of the current evolving La Niña. It depends on how closely this winter follows the statistical averages of previous La Niñas. It depends on what months you're really talking about (some will be better than others), and some weeks or days during those months may have you really cursing or praising all of these long range predictions. So however the upcoming winter really does evolve, it comes down to this...enjoy every day as much as possible, make safety a concern every time you venture into avalanche terrain, and know that the weather (and snowpack) is developing exactly as it should, and it's up to you to translate that development into safe travel decisions. With all that said, it does appear that

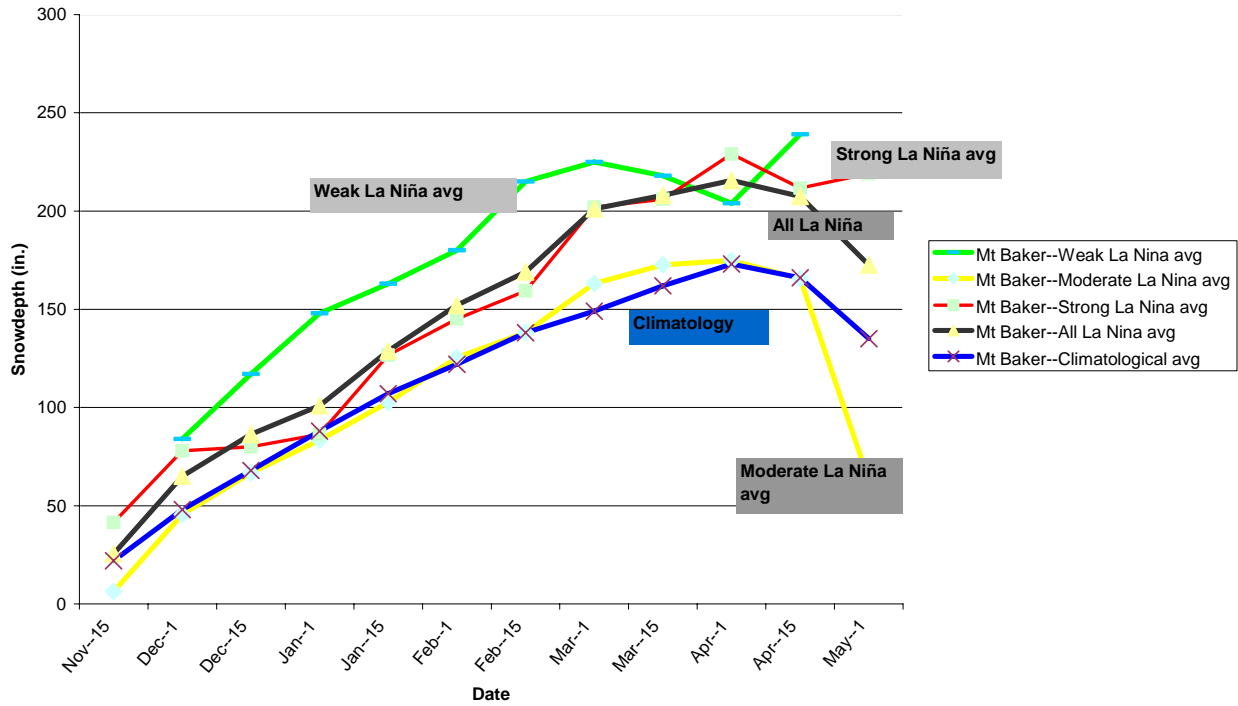


wetness will not be a problem starting out the season as the [November precipitation outlook](#) suggests. While the corresponding [temperature chart](#) for the expected November timeframe is not as optimistic for the NW (temperatures are expected to be slightly above average), there will no doubt be times that both temperature and precipitation should be favorable for some late fall snow accumulations.

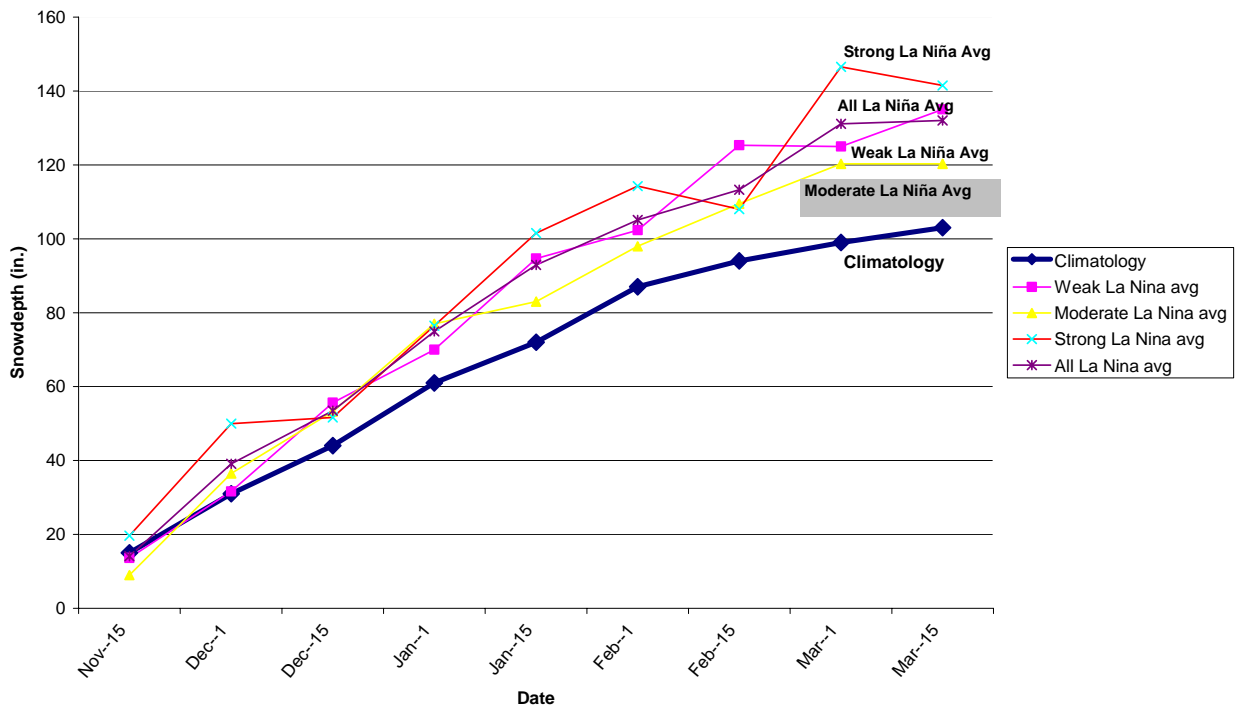


Indeed, as the following statistical snowdepth charts for La Niña (derived from NWS La Niña rankings of La Niña strength and NWAC snowdepth records) indicate that such events normally favor snowpack depths that generally track above climatological snowdepths. So, the advice is to keep the faith, and know that temperatures will fall, snow will come, and snow covered steep (sick?) terrain will provide increasing joy while simultaneously testing our best travel and stability assessments.

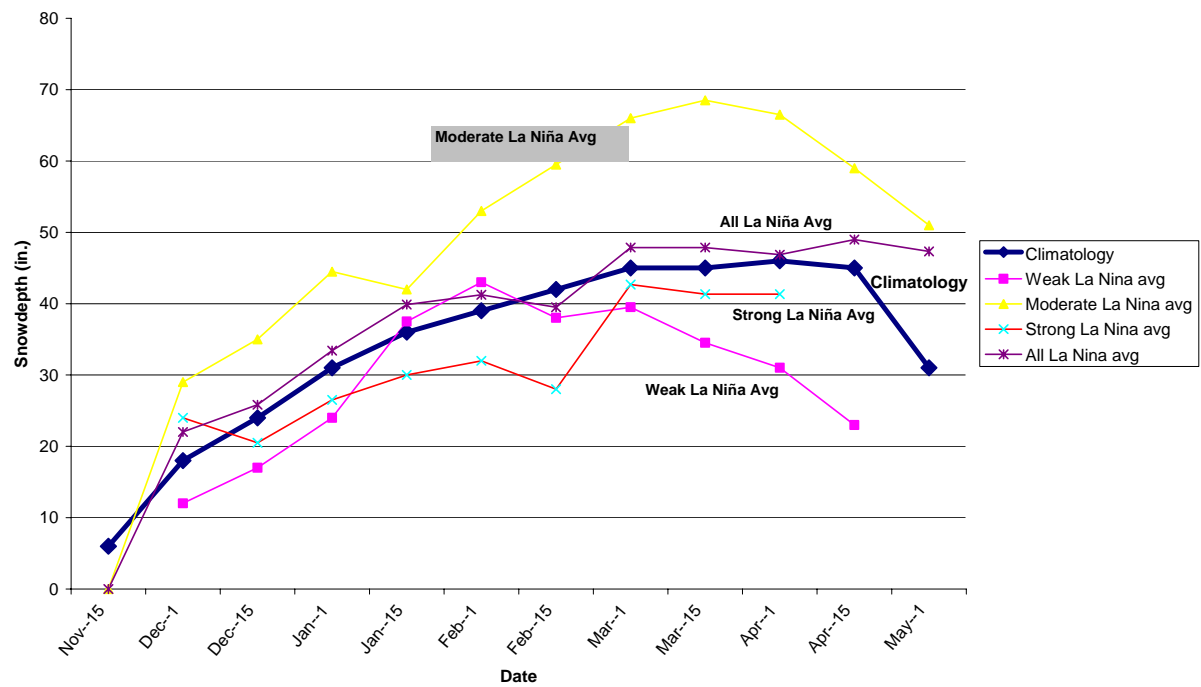
Mt Baker Snowdepths--La Niña years versus climatology



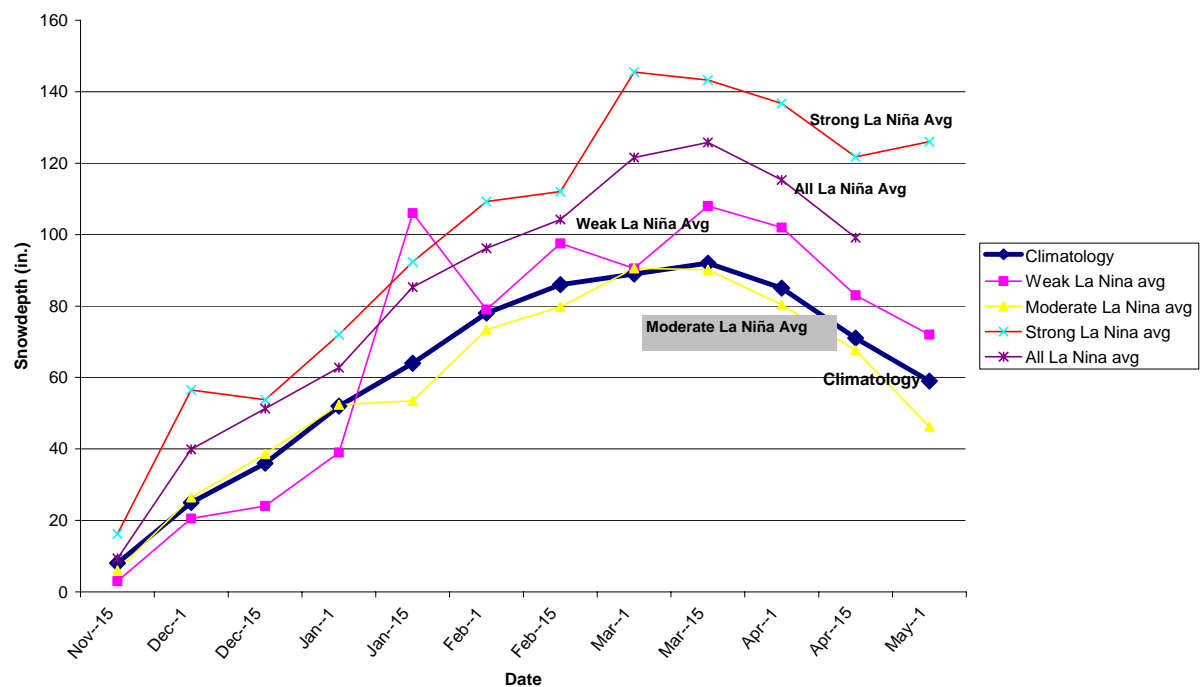
Stevens Pass--La Niña years versus climatology



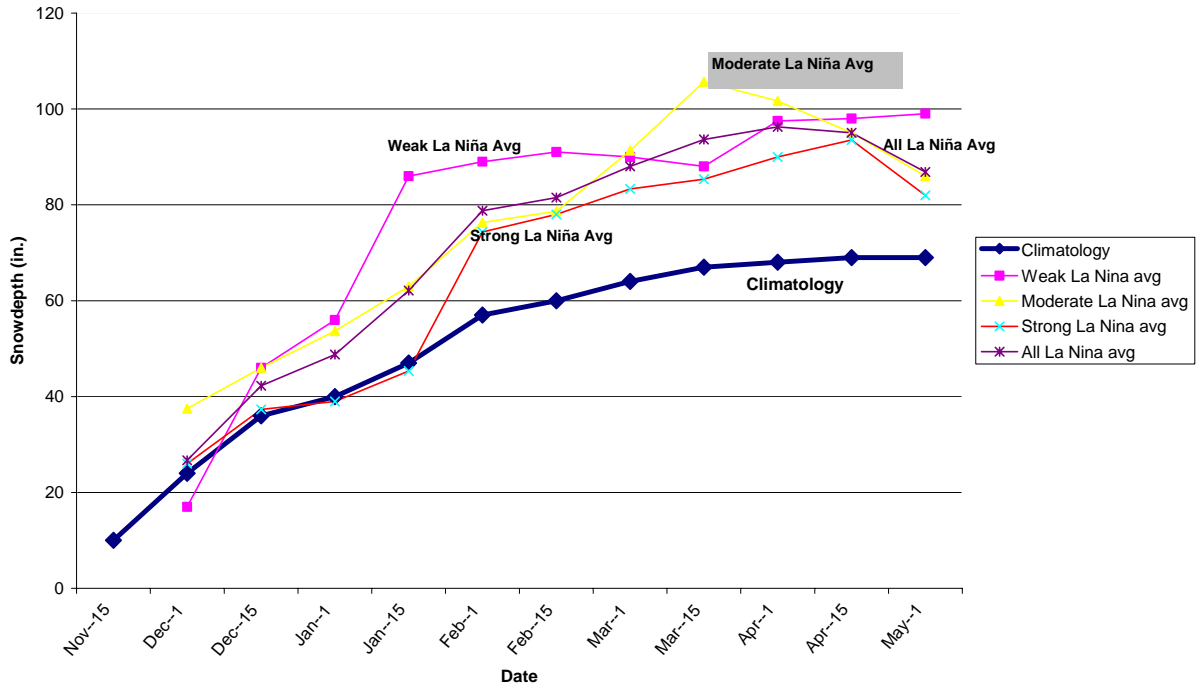
Mission Ridge--La Niña years versus climatology



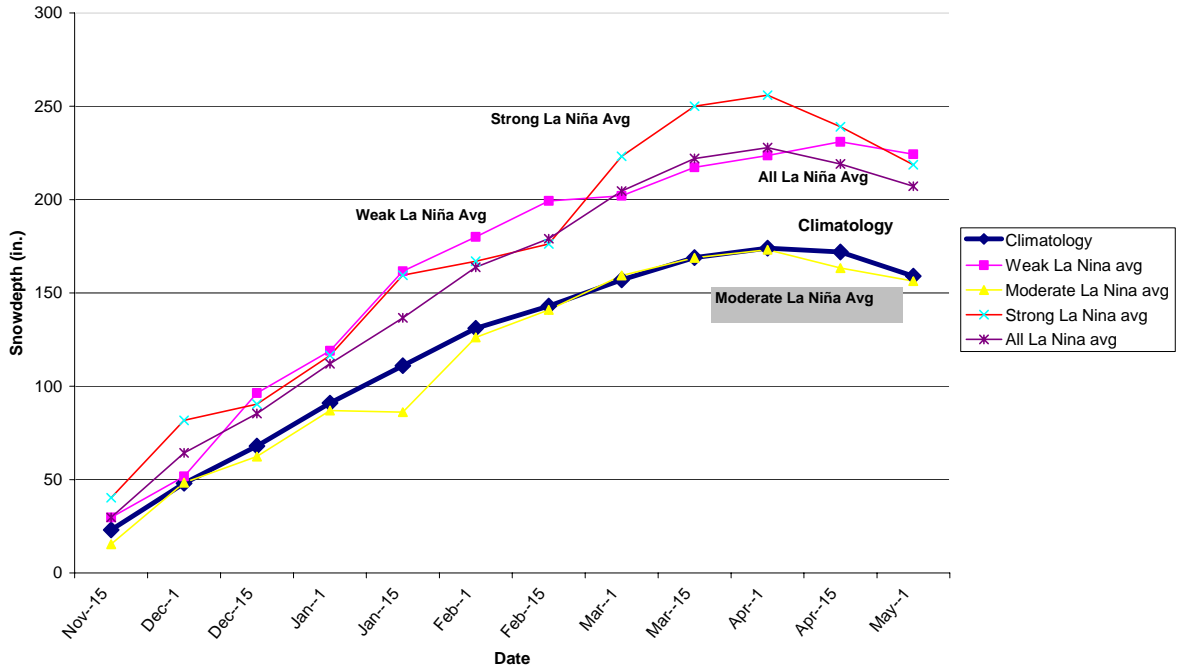
Snoqualmie Pass--La Niña years versus climatology



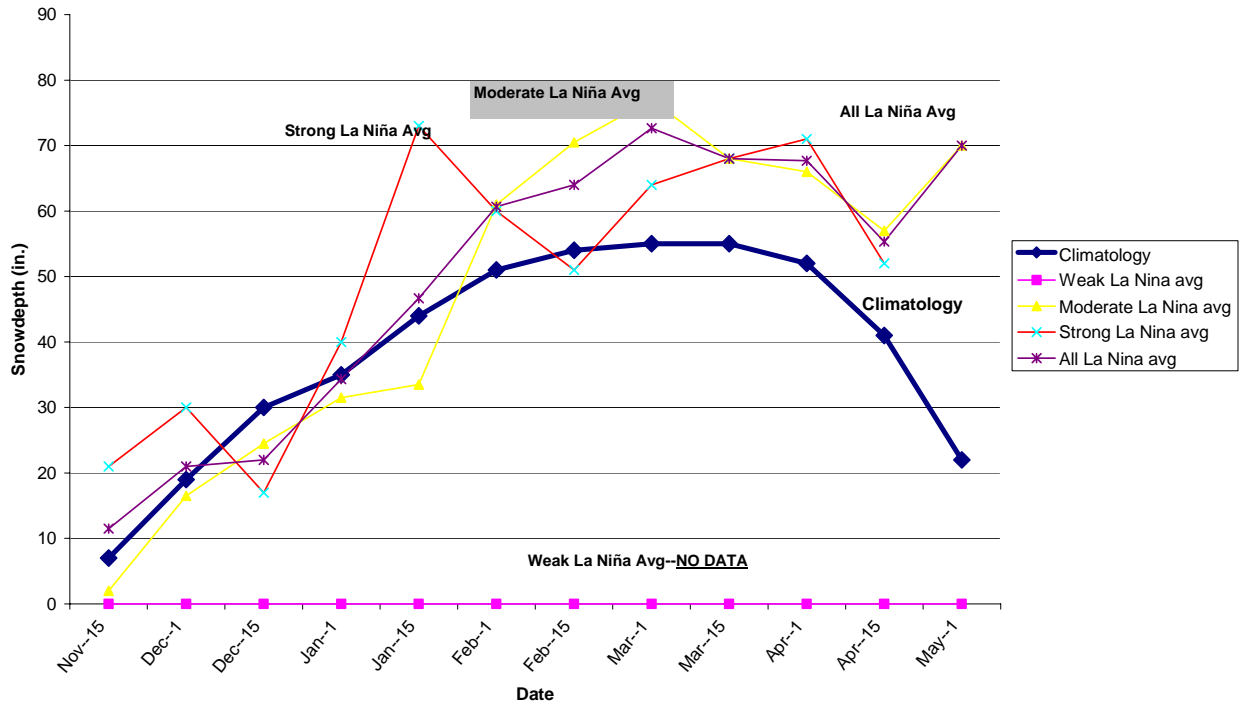
Crystal Mtn--La Niña years versus climatology



Paradise--La Niña years versus climatology



White Pass--La Niña years versus climatology



Mt Hood Meadows--La Niña years versus climatology

