The climate system threw a curveball in December, drenching Arizona and New Mexico with at least five storms when dry conditions were expected. The rain and snow are a reminder that weather is influenced by more phenomena than La Niña, and that La Niña events do not preclude wet periods. Copious precipitation fell during December 2010 in most of Arizona and northern New Mexico, for example, before record-setting dry conditions set in and persisted through the spring.

The typical La Niña atmospheric circulation pattern directs storms north of the Southwest (Supplemental Figure 1). However, it also favors a more sinuous jet stream that sometimes loops south and into the region. The latter occurred in the last month, and the swift winds aloft ferried cold and moist air from the north (Supplemental Figure 2). During several storms, the cold air also mixed with tropical moisture wafting from the south, creating a serendipitous mix ideal for widespread and heavy precipitation.

Since the water year began on October 1, rain and snowfall have been above average in western Arizona and New Mexico (Figure 1), with the most precipitation falling in the White Mountains of Arizona and high elevations of southwestern New Mexico. In December, the southern two-thirds of Arizona was generally wetter than average, and most of New Mexico received more than 200 percent of average, with a few areas tallying more than 800 percent (Supplemental Figure 3). Up to 12 inches of snow—accumulations not seen in decades—blanketed southeast New Mexico, home to the state’s most severe drought conditions since March 3. The most significant precipitation event in the Southwest occurred during December 12–14, when cold air converged with a slug of tropical moisture from the south.

The pervasive and heavy precipitation substantially improved drought conditions in both states (Figure 2). Extreme and exceptional drought covered only 3 and 23 percent of Arizona and New Mexico, respectively, as of January 3. One month ago, extreme and exceptional drought smothered 30 and 36 percent of Arizona and New Mexico, respectively. Many of the recent storms, however, missed the Upper Colorado River Basin, where snowpacks—from which about 70 percent of the water in the Colorado River originates—remain low (Supplemental Figure 4).
More typical, dry La Niña conditions have returned in recent weeks, and the expectation is these conditions will prevail for most of the winter.

La Niña conditions teeter between weak and moderate strength. The forecast issued by the International Research Institute for Climate and Society assigns more than a 60 percent chance that La Niña will persist during the February–April period (Supplemental Figure 6).

Historically, weak La Niña events deliver less than 75 percent of the December–March average for most of Arizona and New Mexico. Weak events, however, are not as dry as moderate or strong events.

Precipitation outlooks call for elevated chances for below-average rain and snow, which, in turn, are feeding forecasts for the persistence or intensification of drought in most of Arizona and New Mexico through March (Supplemental Figure 7).

Despite early snow, forecasts for the Verde and Salt rivers in Arizona call for less than a 65 percent chance that spring streamflows will be above median (Supplemental Figure 8); forecasts for the Upper Colorado River and Rio Grande basins also are below average.

A looping jet stream, which often accompanies La Niña events, ferried cold northern air into the region, causing temperatures to be below average across the region (Supplemental Figure 9).