Climate and fire connections: the 2010 fire season in review and beyond

By Zack Guido

Wildfires burning in the Southwest this year have grabbed headlines but haven't come close to the region's average for acres burned. Fires in the last 20 years have charred more than 410,000 acres on average in Arizona and New Mexico. As of mid-July, a date when the height of fire activity has past, only about 145,150 acres have burned. With the monsoon rains beginning to dampen the Southwest's 2010 wildfire season, CLIMAS staff scientist Zack Guido turned to Richard Naden, fire meteorologist and coordinator of the Remote Automated Weather Stations for the National Park Service, to talk climate, weather, and fire management.

Figure 1. The Paradise Fire raged near Alpine, Arizona, on June 22. The fire began from a lightning strike on June 7 and burned about 6,355 acres. Photograph is courtesy of John Burfiend, Air Tactical Specialist for the U.S. Forest Service.

In a July 7 interview, Naden, who is also part of the Southwest Coordination Center, a multi-agency fire management group that coordinates fire management in Arizona and New Mexico, shed light on several aspects of Southwest wildfire: the weather patterns that suppressed fire activity this season, the natural climate oscillations that set the stage for active or quiet fire seasons, climate change effects on future fire seasons, and the application of fire outlooks for allocating fire-fighting resources.

The following transcript is a slightly abridged version of the discussion. You can listen to the entire discussion by downloading the mp3 audio file from our Web site: http://climas.arizona.edu or browsing to the discussion on iTunes. See last month's issue for reference.

Question: How has the fire season unfolded in the Southwest this year?
Richard Naden: In the large scheme of things the season has unfolded how we expected. We have had a slow year or a below-average year. If you are looking at statistics, we are probably going to have a little more than half of the average of the acres burned for a year. Right now we have had about 108,000 acres burned... The only time we had high fire activity has been in June, which is normally our biggest fire month and this year was no exception. The Southwest had cool temperatures through May, which we were anticipating with the dissolving El Niño and the evolving La Niña, which I was anticipating back in April. …We've had a quick flip in the El Niño–Southern Oscillation pattern. We've gone from basically a moderate to strong El Niño to at least a moderate La Niña right now in a matter of two or three months. And that's driving the weather situation for us entirely. I did some statistics for other years when we have seen a similar flip—there have only been a couple of similar years. One of those years was 1998, and that year was a below-average fire season. Using that knowledge, using that analog year and recognizing trends in weather patterns, we were able to predict a down year with a peak around mid- to late June, which is indeed what occurred.

Q: Can you define the Southwest region?
RN: The Southwest for us is the western third of Texas, …a small sliver of western Oklahoma, …and all of Arizona and New Mexico.

Q: When is the fire season in the Southwest?
RN: Typically our main fire season is from around March 15 to about July 15. Some years, typically La Niña winters, we have fires as early as December and January, typically in the eastern Plains. In poor monsoon years, we could have fires burning into August.

Our main fire season was only about three weeks this year, from around late May to June 20. The last few weeks have really slowed down, especially the last two weeks because we started having moisture coming in and temperatures cooled off

continued on page 4

Climate and fire connections, continued

Figure 2. The Rio Fire burned about 1,356 acres in the Santa Fe National Forest about 30 miles west of Los Alamos. Human activity on June 1 started the blaze. Photograph is courtesy of John Burfiend, Air Tactical Specialist for the U.S. Forest Service.

some. In order to get big fires in the Southwest you need excessive heat with low humidity values and some source of ignition—either human-related or some lightning a few days after the heat. That's what we had around June 6 when we had a pretty epic lightning event along the Continental Divide area, the Gila National Forest region, and the White Mountain area, and that really got our fire season going this year. …That was really the event of the year. A lot of fires we had this year started with that lightning event. We had the Shultz Fire start near Flagstaff, Arizona [during this event], which was probably the most notable fire this year.

Q: How big was the Shultz Fire?
RN: 15,000 acres.

Q: How does that fit into a historical perspective of large fires?
RN: The other large fire was the South Fork fire in the Santa Fe National Forest. [That fire] was 17,000 acres… But the Shultz fire was in the news more. As far as how large those fires were [in a historical context] I would say they are below average. Some of the biggest fires we saw back in 2001, 2002, and 2003, when we hit our heyday, were several hundred thousand acres. One of the reasons we were able to corral fires so well this year was because we were the only game in town. All the other geographic areas were not doing anything in early June. We were able to grab other national resources and move them down here from the northern Rocky Mountains, Idaho, and the Pacific Northwest and when we had that advantage, which normally the Southwest does, we were able to corral the fires and prevent them from becoming epic. Sometimes when our fire season dangles further into July and goes into August, and there is more activity in the Great Basin and southern and northern California, for example, that's when the national situation becomes murkier. Some of these other geographic areas start asking for more helicopters, more air tankers, more crews, and we have to pull them out of here even when our fire season hasn't collapsed. This year we didn't have that. We had everything at our disposal. We had as much as we wanted—all the crews. There was a period

continued on page 5

Climate and fire connections, continued

of time in early June when all the crews were committed, but within a week and a half it slowed down incredibly and the crews became available again and they still are to this minute.

Q: How do El Niño events, like the one we had this past winter, impact the fire season?

RN: In general, El Niño is going to lead to a down fire year just because there is more moisture in the soil—unless it turns out the El Niño is more feeble, which has occurred at times. There are different flavors of El Niño. It doesn't always mean we are going to get sopped for three months straight. But in general, it means we should be tamer in the fire season once we get there.

We put a large emphasis on climate. I stare at this information all the time. I believe it's the driver of everything. If you're watching these oscillations, and by natural oscillations I am talking about the Pacific Decadal Oscillation, Atlantic Multidecadal Oscillation, El Niño–Southern Oscillation, and others, we really believe that if you look at these and relate them to the past you can foretell weather patterns and the fire patterns because of the weather patterns.

Q: How might climate change affect future fire seasons?

RN: That's a murky area. There is not really a lot of foresight and resources devoted to this. I'm not an expert on this but I have some knowledge. … I guess the present belief right now is that we might be entering a period of cooling that might possibly mask the large scale global warming signal we have been experiencing the last 30 years. We might be entering a period of global cooling just due to some switches in the natural oscillations across the globe. … Again, this is not clear cut. But I wouldn't be surprised if we go into a period of cooler temperatures for the next decade or two and then by 2030 onward to 2050 we could be really warm, perhaps dangerously warm, since we are still putting out the fossil fuels during this whole time frame and the natural oscillations are masking the underlining warming for the next several decades. …This would possibly portend some epic fire seasons by 2025 onward. I don't really know.

Q: How do climate and fire outlooks create advanced preparation?

RN: This has been an evolving thing. I've been here since 2003. A lot of this is dependent upon knowledge and expertise and experience and trust. …We had to prove our predictive capabilities, prove that we could gage fire season in advance. And we are not perfect. For example, last year the flip from La Niña to a quick El Niño in May I didn't see coming, and the switch really changed our fire season. We had a slow start in 2009. There were toads in my back yard in Albuquerque in mid- to late June, which is typically the driest and hottest month in New Mexico. It was moist and wet. This was due to the transition from La Niña to El Niño in a matter of six weeks. It changed the weather to a wet signal. This was something we were surprised about. Later in the summer the fire season kind of dragged on into August.

It really has come down to experience and getting the fire management community here and the people we associate with to trust our predictions and our forecasts. And to a certain extent we must be doing a pretty decent job or they would not believe us. I think fire management through the years, 15 to 30 years ago, was more reactionary. There wasn't much planning. A fire ignited and [fire management would] send everything you got. Now, a manager comes back and says we have these three fires burning and asks which is likely to last the longest and why. Or, for example, the person in charge of allocating the air tankers might walk back here and say, "I have four tankers here, I have two in Fort Huachuca, Arizona, one in Winslow, Arizona, and one in Albuquerque. Should I move the one in Albuquerque to Silver City or Fort Huachuca?" This is just an example of how we can use our knowledge of weather and climate to gage where we need to move resources. These helicopters and air tankers cost about $15,000 in fuel just to move them, [climate and weather information feeds] into high dollar decisions.