**BlueSky Exercise**

**Objectives**

1. To learn where to find daily BlueSky output products and how to download them and load into Google Earth.
2. To understand that different BlueSky runs use different dispersion model configurations.
3. To learn some of the differences between puff and particle BlueSky runs.
4. To understand if and which model runs are more accurate.
5. To gain experience in interpreting BlueSky model output.

**Exercise Steps**

1. Go to <http://www.airfire.org/data/bluesky-daily/> and scroll down to “California/Nevada.”
2. Go to the “PUFF“ section, 3-day Forecast, 2km met, 00Z row.
3. Go to the far right column (“Avail kmzs”), and in the drop-down window, scroll down to 20130824. Verify that date is in the drop-down window, and click on the “kmz” button to download the kmz file. This will be BlueSky output for August 24th, 2013, 00Z (which is 5PM PDT, August 23rd). Once you download this file, rename it to give it a unique file name. For example, the downloaded file will be named “smoke\_dispersion.kmz.” Rename the file to “puff\_00Z\_24Aug2013\_smoke\_dispersion.kmz” or any other unique, identifying name.
4. Scroll down a bit farther to the “PARTICLE” section (still in the “California/Nevada” block), 3-day Forecast, 2km met, 00Z row.
5. Go to the far right column (“Avail kmzs”), and in the drop-down window, scroll down to 20130824. Verify that date is in the drop-down window, and click on the “kmz” button to download the kmz file. This will be BlueSky output for August 24th, 2013, 00Z (which is 5PM PDT, August 23rd). Once you download this file, rename it to give it a unique file name. For example, the downloaded file will be named “smoke\_dispersion.kmz.” Rename this 2nd file to “particle\_00Z\_24Aug2013\_smoke\_dispersion.kmz” or any other unique, identifying name.
6. Open both kmz files in Google Earth. They should already have unique names within Google Earth (the puff run is “BlueSky Hourly Total PM2.5” and the particle run is “DRI 2km pp BlueSky Hourly Total PM2.5”), but you can rename them within Google Earth if you want.
7. We are going to look at dispersion from the Rim Fire, with an approximate location of 37.86 latitude and -120.09 longitude.
8. Advance the time slider bar in Google Earth to approximately 3PM, Aug 24 (the time stamp on the time slider bar in Google Earth does not always fall exactly on the hour).
9. Check the box next to the puff kmz and uncheck the box next to the particle kmz. **QUESTION: What is the predicted dispersion from the Rim Fire (you may need to zoom in or out a bit)?** ***ANSWER: Very high concentrations to the north and east of the fire, east of Lake Tahoe, Carson City, and Reno.***
10. Now check the box next to the particle kmz, and uncheck the box next to the puff kmz (if you don’t do it in this order, the time slider bar will go back to Aug 24, 5PM PDT).
11. **QUESTION: Now what is the predicted dispersion pattern from the Rim Fire?** ***ANSWER: It shows high concentrations in about the same area, but it appears there are many fewer “red” pixels, and the overall dispersion pattern is more pixelated.***
12. **QUESTION: Which dispersion pattern do you think is correct?** ***ANSWER: Neither. They are both showing similar, yet different solutions. In this case, the images look very different because of the way the dispersion model (HYSPLIT) is configured (puff vs. particle). The important point is that you can get useful information from both model runs, and you should look at them both when trying to anticipate smoke impacts from fire.***
13. Move the time slider bar ahead 12 hours to 3AM, Aug 25. **QUESTION: Describe the differences between the two model runs.** ***ANSWER: The two dispersion patterns are similar, in that they generally agree on where smoke impacts will be greatest. The puff run tends to have larger “bulls-eyes”, while the particle run appears to organize smoke impacts along terrain features.***
14. **QUESTION: Do you think the puff model run or the particle model run is more accurate?** ***ANSWER: Again, there really is no correct answer here. In this case, the particle run certainly looks more “realistic”, but remember it could be “realistic” yet “wrong” (for example, it could show high concentrations in the wrong drainages).***

Conclusions: If you are working smoke on a fire (or a complex of fires), looking at BlueSky output every day will help you assess and interpret the model output. Using more than one model (e.g. puff vs. particle, different resolutions and/or different domains) will give you a better “big picture” than any single model alone.

In addition, if you have monitoring data to compare with model output, remember there is a bit of an apples-to-oranges comparison between monitoring data and model output. Even at spatial resolutions of 2km, monitors could be located in drainages that are not visible to the model. Monitoring data is good to use to verify the model prediction of presence or absence of smoke, and also a relative measure of concentration, but users need to be aware of the limitations of using monitoring data to “verify” model output.

Interpreting model output is an art. You need to do it every day, and compare with other sources (satellite data, air quality data, etc.). This will improve confidence and allow the user to add value to the raw model output.