

Remote Sensing - Follow-up to New Orleans Fire Workshop

notes from 6.3.04 meeting/call

Participants: Meeting in DC was arranged by Joe Kordzi (EPA-R6), Jim Szykman (EPA-ORD), David Williams (EPA-ORD), Pete Lahm (USDA-FS) & Tom Pace (EPA-OAQPS). Others participating included: Elaine Prinz (NOAA), Donna McNamara (NOAA), George Stephens (NOAA), Chris Justice (NASA), Shobha Kondragunta (NOAA), Tom Pierce (EPA/ORD), Al Riebau (USDA-FS), Amber Soja (NASA), Ed Masuoka (NASA), Jacques Descloitres (NASA), Doreen Neil (NASA), Alan Rush (EPA-OAQPS).

Fire location/time/size – Discussion centered on use of IR spectra from GOES & MODIS to locate fires. The capability to use satellite data effectively has improved significantly in the past several years. GOES lacks the sensitivity of MODIS (an instrument on AQUA & TERRA satellites) but has the advantage of 30 minute scans vs the 4 per day for MODIS. Neither can see through clouds, but the frequent scanning of GOES enhances its usefulness, especially in partial cloud environments. GOES can detect forest fires of about 0.25 ha on average in the contiguous US, less for grass & understory burns. There is a useful synergy obtained by using data from GOES & MODIS together.

False positives are reduced from 20% to only 3% when the proper “filters” are used to QA the IR signal. A limited intercomparison of satellite-derived and field reported fire location & size data was done in Ontario. Results were reportedly impressive. The sense of the discussions is that the use of satellites to augment fire occurrence data is a maturing, readily available technology that is believed to be useful now. Data systems are already operational to provide this information to fire inventory experts. However, as a first step, we need to compare fire event logs and archived satellite event data for several US locations (NW and SE?).

Burn scar – The satellites are capable of estimating the area of a fire instead of the burn perimeter. However, this technology is not as mature as the location/time/size capability. Additional discussions and follow-up are recommended with key principal investigator(s).

Burn Severity – The energy output of a fire can be estimated from the strength of the IR signal. However, as with burn scar, this technology is not as mature as the location/time/size capability. Additional discussions and follow-up are recommended with key principal investigator(s).

Aerosol & Smoke Production – Research is proceeding on the use of aerosol optical depth data and use the data to track plumes and map spatial extent of ground level pollutants. Much work remains to be done. A future satellite (CALIPSO) will contain a LIDAR instrument that will provide synergistic observations with AOD from MODIS

(AQUA) The LIDAR data combined with MODIS AOD will enhance the capability to estimate pollutant concentration within a range of atmospheric layers from space. However, its ultimate use to estimate ground level pollutant concentrations may prove to be an elusive goal.

Conclusions and Next Steps – The call participants generally agreed that satellite data will be useful to identify fire events & estimate their emissions. Based on this assessment, we should form a cross-agency task group and begin work on the following:

- 1) compare (and reconcile) satellite-determined and field-recorded fire events (using archived databases) for several US locations, preferably for CY 2002. Initial focus will be on locating fires in time & space but there is potential to use the heat sensing capability of satellites to estimate fuel consumption. Note, until the comparisons are made, its unclear just how dependent can we be on the satellite data (its a given that it will be useful, but the comparisons should tell us how useful); A call was arranged for June 24 to discuss specifics of this inter-comparison.
- 2) develop protocols for using existing fire products from NOAA and NASA. First priority is to QA and augment field-recorded fire events databases, but if practical, also develop protocols to track fire plumes and estimate fuel consumption of specific fires through remote measurement of energy release;
- 3) determine how to best implement these protocols (roles, responsibilities and funding);
- 4) determine how to best use satellite-determined events data to improve current methods for estimating emissions from Mexican fires.