

BlueSky and related work

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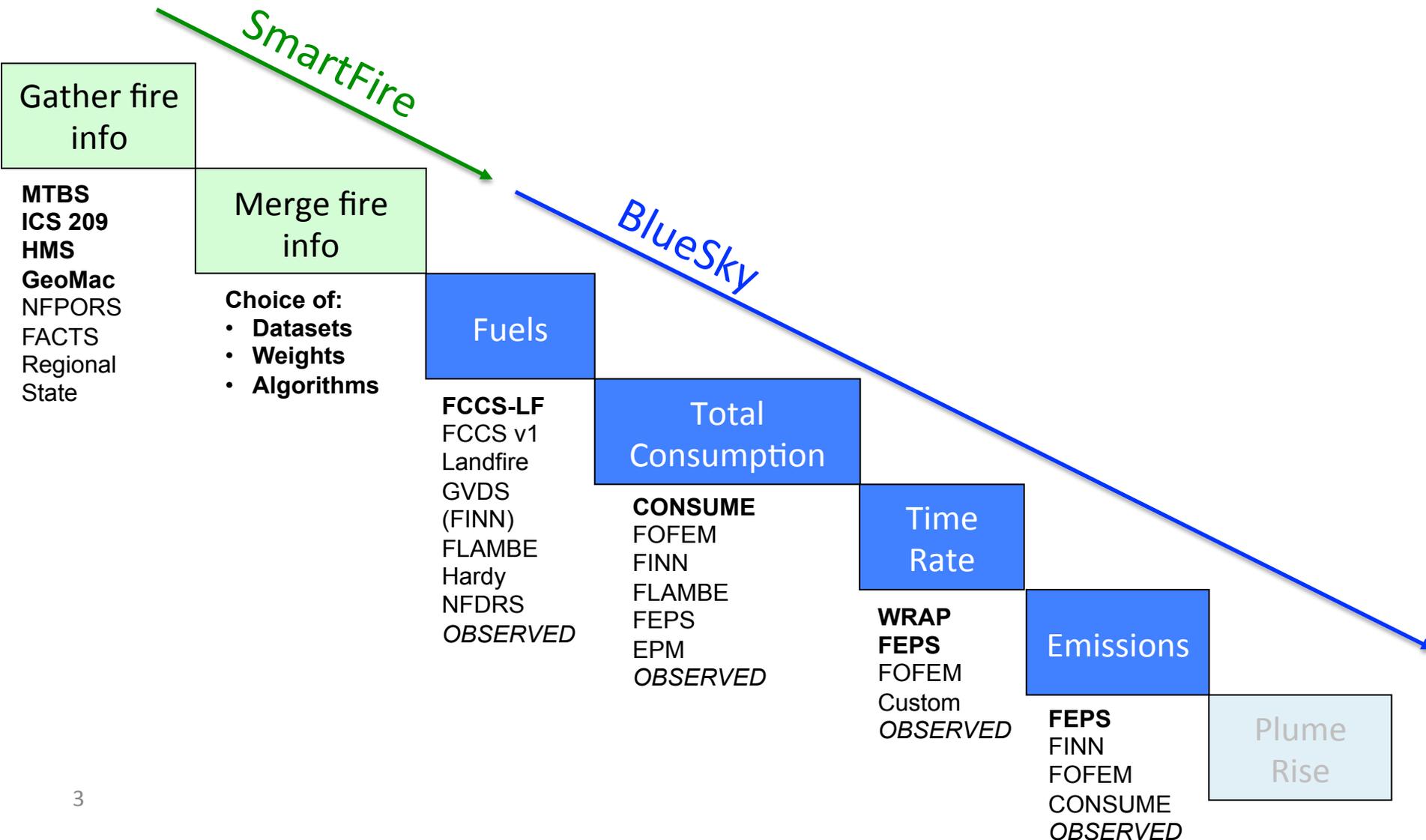
NWAIRQUEST
June 5, 2013



BlueSky and SmartFire

- **The BlueSky Framework** was developed to compute smoke emissions (and impacts) given known fire information.
- **The SmartFire 2 System (Framework)** was later developed to help reconcile disparate sources of fire information into a useful data stream
- **Together, SmartFire 2 → BlueSky** can take in multiple heterogeneous fire information datasets and create a unified fire emissions inventory suitable for further modeling

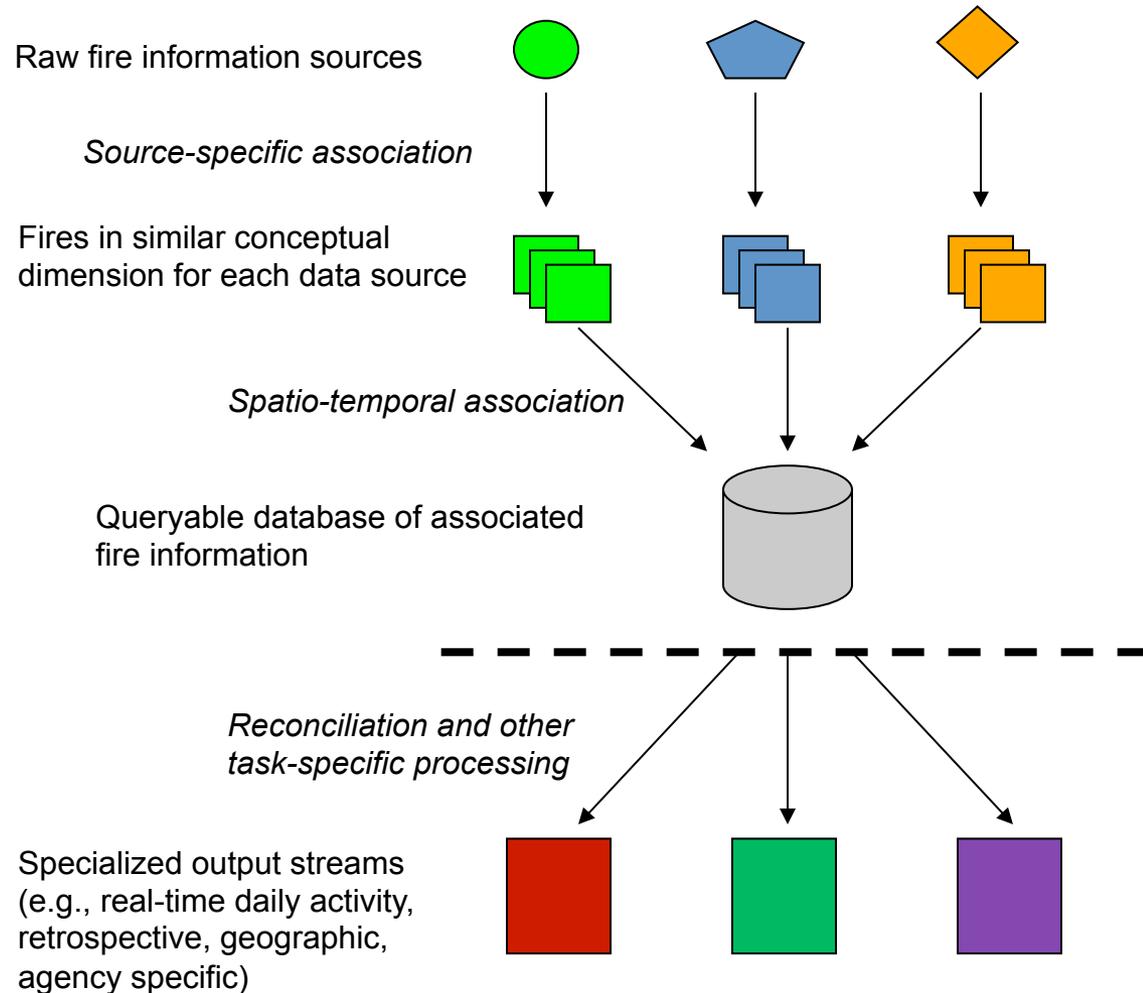
SmartFire -> BlueSky



SmartFire v2

Fire Information System

- Collects disparate fire information data
- Associates across fire reporting systems
- Reconciles fire information
- Any number of datasets
- Includes assessment of uncertainties in source data



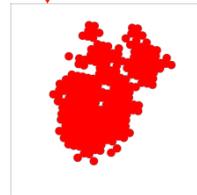
The SF2 Process

1. Get data from multiple sources



2. Produce fires from each data source separately

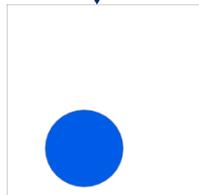
Size
Type
Start
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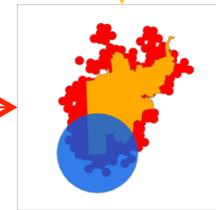
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Size
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3. Associate nearby fires across data sources



4. Reconcile associated fires to create best guess information

Size
Type
Start
End



Where does BlueSky go?

- Daily runs
 - Smoke Only:
 - Regional: PNW 4km, CA/NV 2km, Western Canada 4km
 - National: NWS 12km, GFS
 - Working on PNW 1.33, NWS 4km, AK, HI, Eastern Canada
 - Air Quality:
 - NW-AIRQUEST, STI CONUS
- Incident support runs
 - What if? Scenarios
- Custom smoke model runs (Playground)
- Emissions Inventories (for all of the above plus)
 - EPA National Emissions Inventory 2011
 - 10 year climatology (2002-2011+)
 - Asia?!?
- Research
 - Model uncertainties, validation (e.g. SEMIP project)
 - Test cases
 - Future climate fire scenarios

What's new?

- Not enough.
- The sequester / CR really hurt. We are behind schedule (but catching up fast).
- In the meantime, we've had issues with reliability – aging servers, melting servers, lapsing contracts, and other fun things. This has directly and adversely affected NW-AIRQUEST.

What's new?

- SmartFire 2
 - More sources = better, more reliable
 - ICS 209, GeoMac (NIPORS), HMS, MODIS, GOES, Burn Scar
 - Click through to see all underlying info on a webpage
 - Cloud repository coming (much more reliable)
- BlueSky v3.5
 - Updated everything (OS, fuels, consumption, more models, etc...)
 - Includes HYSPLIT 4.9 MPI (testing)
- Available right *now*.
 - *WSU to be updated this week or next.*

What's new?

- BlueSky Playground v2
 - Revamped interface
 - More met choices
 - Trajectories and
- Air Resource Advisors
 - New role for large incidents
 - Liaison, Modelers - Incident – Local Agencies
 - First training held March 2013 at AirFire



Home » My Emissions » Monterey WF (Wildfire)

- Size and Location
- Fuels
- Moisture
- Consumption
- Timing
- Emissions
- Notes

Daily Size (growth) in acres

Day 1

15000

Total Size: 15000 acres

[Add a Day](#)



Latitude

36.2506361847

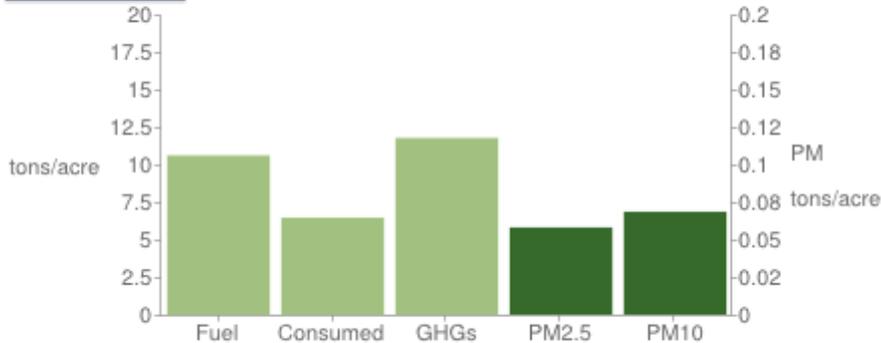
Longitude

-121.61010742

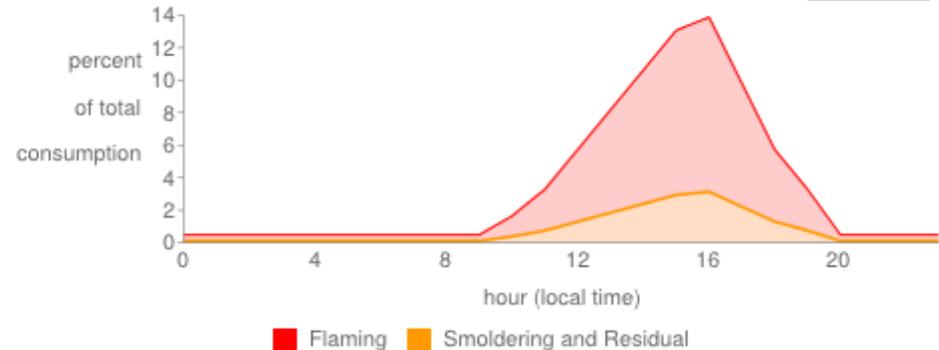
Discard Changes Apply

View Totals

Average Fuels & Emissions per Acre



Diurnal Profile of % Total Consumption Day 1



Coming soon.

- BlueSky-Cloud
 - Moving all incident support modeling to Amazon EC2
 - Scalable, faster
 - Easier website form for custom run request, then kicks off its own “computer” within the cloud
 - Will test throughout 2013 Western Wildfire Season
 - If successful, may point to way to improving Playground, etc...
- Better documentation
 - BlueSky install/setup guide
 - Basics of how to create a module
 - SmartFire v2 journal paper
 - SEMIP technical document

Research

- Quantifying uncertainties / model evaluation
 - SEMIP project

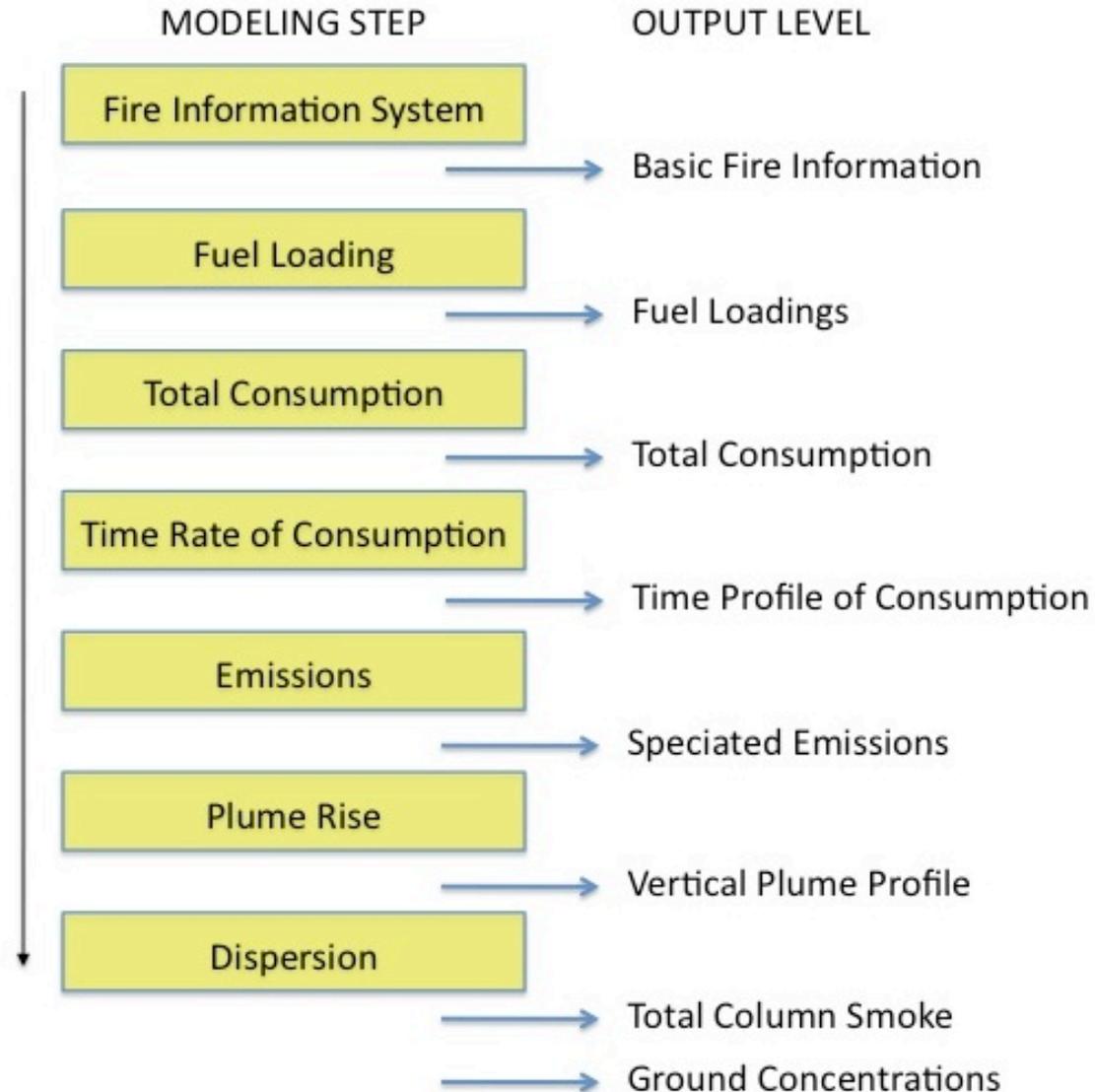
Test Cases

1. FIRES EVERYWHERE
2. NATIONAL EMISSIONS INVENTORY

+ 9. MULTI-YEAR SATELLITE PLUME RISE
CASE



- Model intercomparison
- Quantification of uncertainties
- Top issues identified:
 - Plume rise
 - Fuel loadings
 - Fire detection
 - Diurnal profile



Research

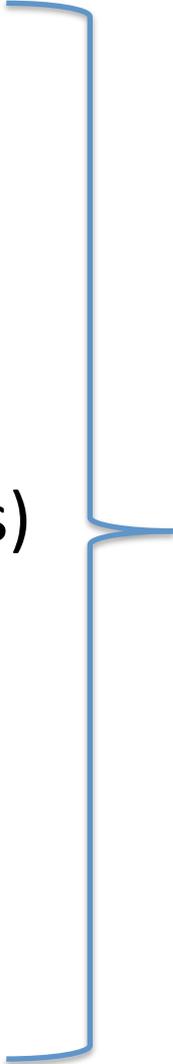
- Quantifying uncertainties / model evaluation
- Limiting uncertainties / model improvements
 - How do we best combine fire information datasets (State db, satellites, etc...)?
 - Plume rise model alternatives
 - Fire growth modeling alternatives
 - (day over day and diurnal profile)
 - Duff consumption issues
 - Updated emissions factors
 - Dispersion model settings

Research 2

- User Tools
 - How do we gather all kinds of information for situational awareness of smoke?

Information

- Local knowledge
- Technical expert judgment
- Static info (e.g. terrain, roads)
- Ground monitoring
- Remote sensing (aircraft, satellites)
- Simple Approximations
- Weather modeling
- Trajectory modeling
- Dispersion modeling
- Chemistry modeling



HOW DO
WE BUILD
INCIDENT
SUPPORT
TOOLS

Research 2

- User Tools
 - How do we gather all kinds of information for situational awareness of smoke?
 - Smoke Complexity Analysis
 - Checklist for things to think about wrt:
 - Firefighter safety
 - Transportation safety
 - Public health
 - Smoke Outlooks
 - Monitoring & modeling
 - Simple enough to understand and use
 - What do we most believe in the predictions? Least believe?

Research 3

- Better emissions inventories
 - NEI 2011 unprecedented effort
 - Over 44 different databases brought together
 - 2002-2011 Climatology
 - Tiered EIs
 - Rapid, lower QA/QC
 - Intermediate (a few months delay, more DBs)
 - Longer (longer delay, all DBs)



Thank you

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More information:

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