

Wellzion Placement and Temperature Traces in Stove-Use Monitoring

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Background



We monitor stove use based on changes in temperature to understand the use of various stoves and fires within the home, to model various impact scenarios, and to contextualize information gathered through other data collection methods.

Field team members are trained in the deployment and management of stove use monitors.

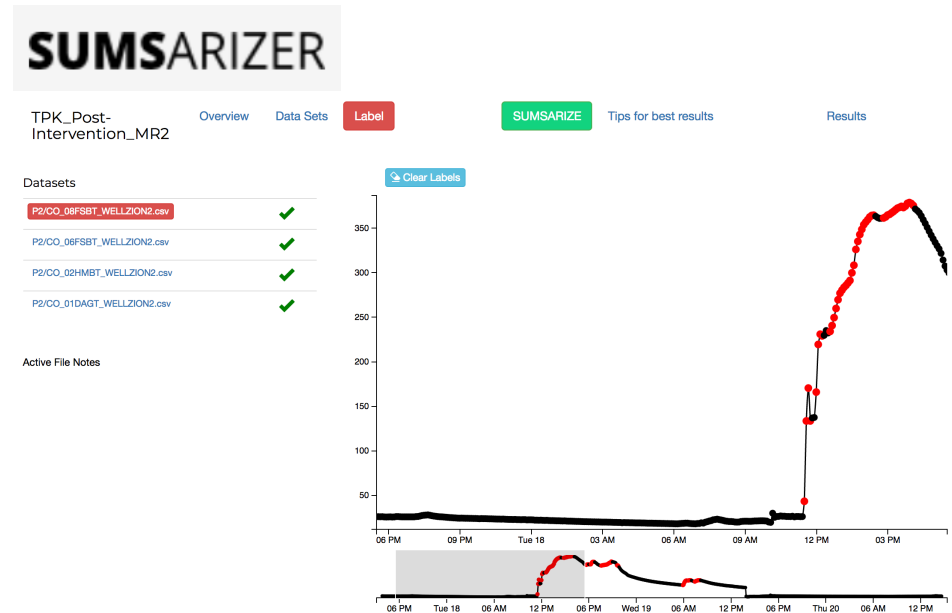
BERKELEY AIR MONITORING GROUP				
SUMs Field Sheet				
HHID	HH Phone #	HH contact name	Field worker name	
Deployment #	Number of buttons placed in home:	Number of buttons (transmissibility checked) at home:	*Stove Types: LPG (LPG), Kerosene (K), Charcoal (C), Wood (W), Ethanol (E), Other (O) (Specify in notes). **Use the following naming convention: ST or CH, (Household), Street Name, Deployment date (dd)	
	Stove 1	Stove 2	Stove 3	Stove 4
SUM or placement changed from last deployment?	<input type="checkbox"/> Yes <input type="checkbox"/> No (skip to SUM launch date)	<input type="checkbox"/> Yes <input type="checkbox"/> No (skip to SUM launch date)	<input type="checkbox"/> Yes <input type="checkbox"/> No (skip to SUM launch date)	<input type="checkbox"/> Yes <input type="checkbox"/> No (skip to SUM launch date)
SUM ID				
Stove Type (use code)				
Location on stove				
Photo taken? Y/N				
SUM launch date (yyyy-mm-dd)				
SUM launch time (hh:mm)				
Time placed on stove (hh:mm)				
Notes				
Date of deployment (end) (yyyy-mm-dd)				
Time SUM removed from stove (hh:mm)				
Max temp (C)				
Min temp (C)				
Name of CSV file**				
Notes				

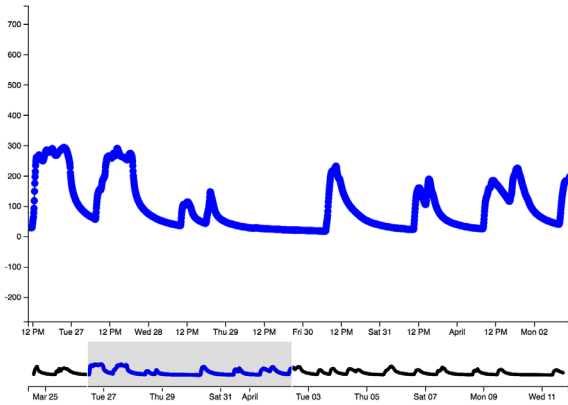
Background

Data comes back from the field in a .csv read out of temperature at preset sampling intervals, which we process using SUMSarizer.

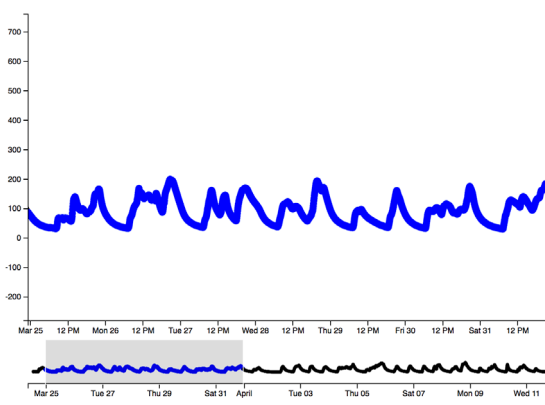
Temperature traces are grouped by stove type, a subset is hand-labeled and SUMSarizer uses ML to generate labels for the remaining traces.

Outputs can be framed as number of events, duration of events, and total cooking time.

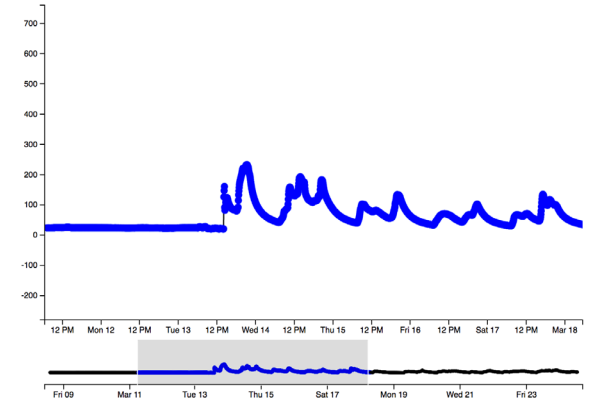




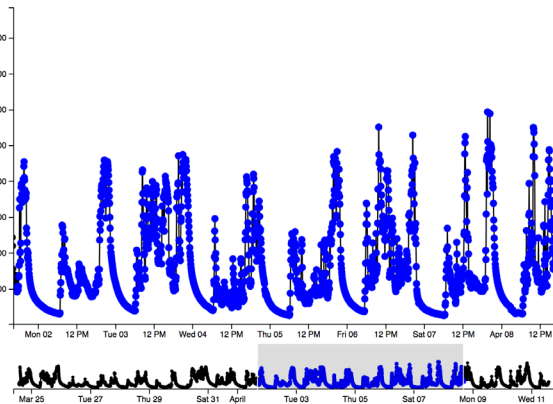
• Blue points indicate those randomly selected as part of the training set.



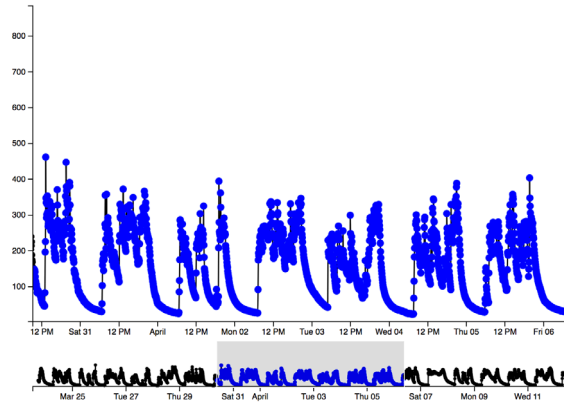
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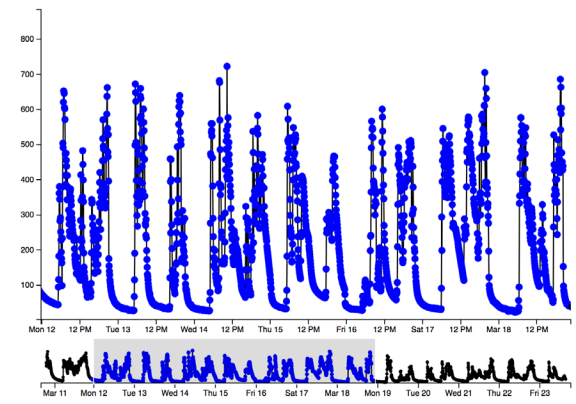
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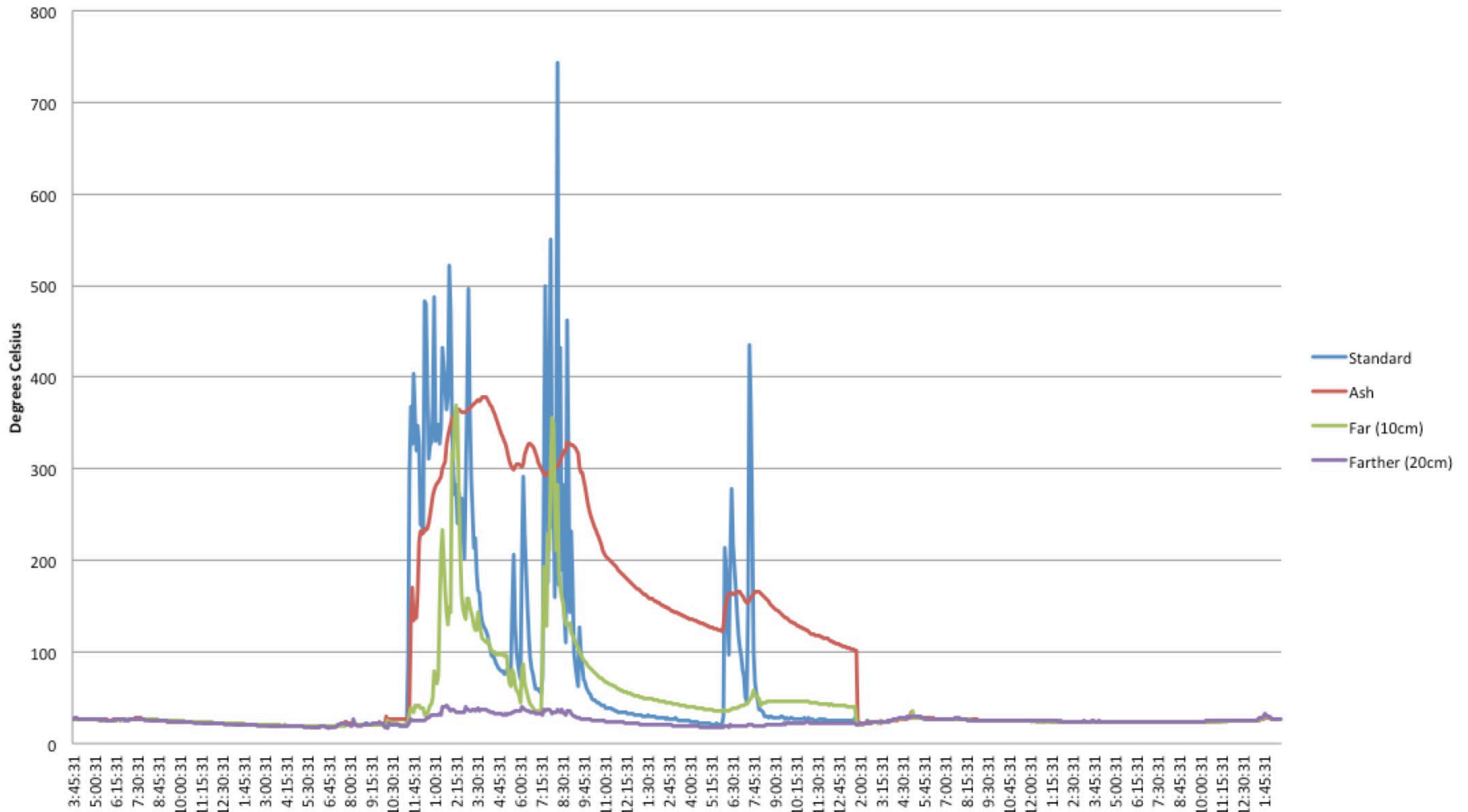
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- #1: Standard radial distance from fire, above ash
- #2: Standard radial distance from fire, under ash
- #3: 10cm further than standard radial distance from fire, above ash
- #4: 20cm further than standard radial distance from fire, above ash

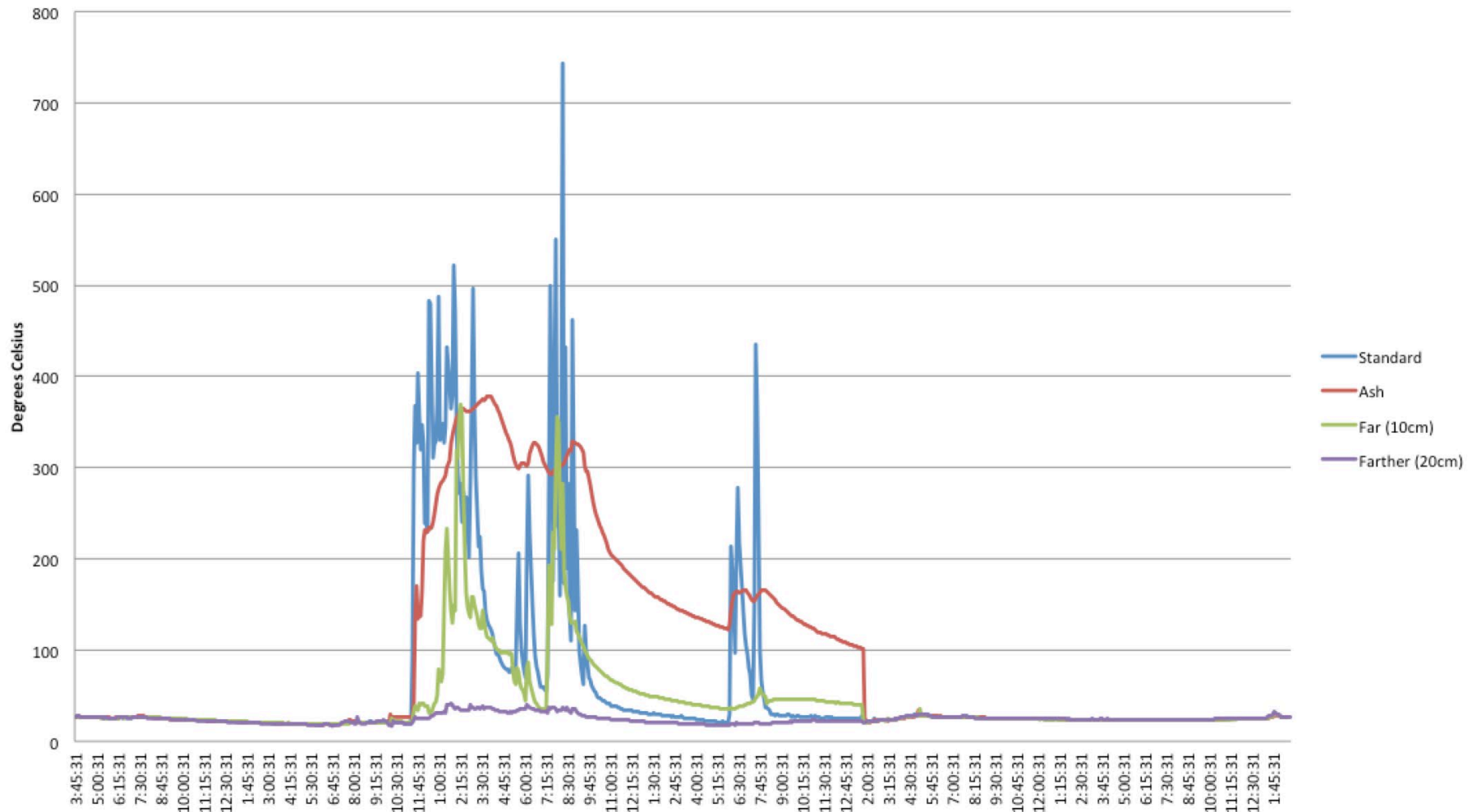


08FSBT



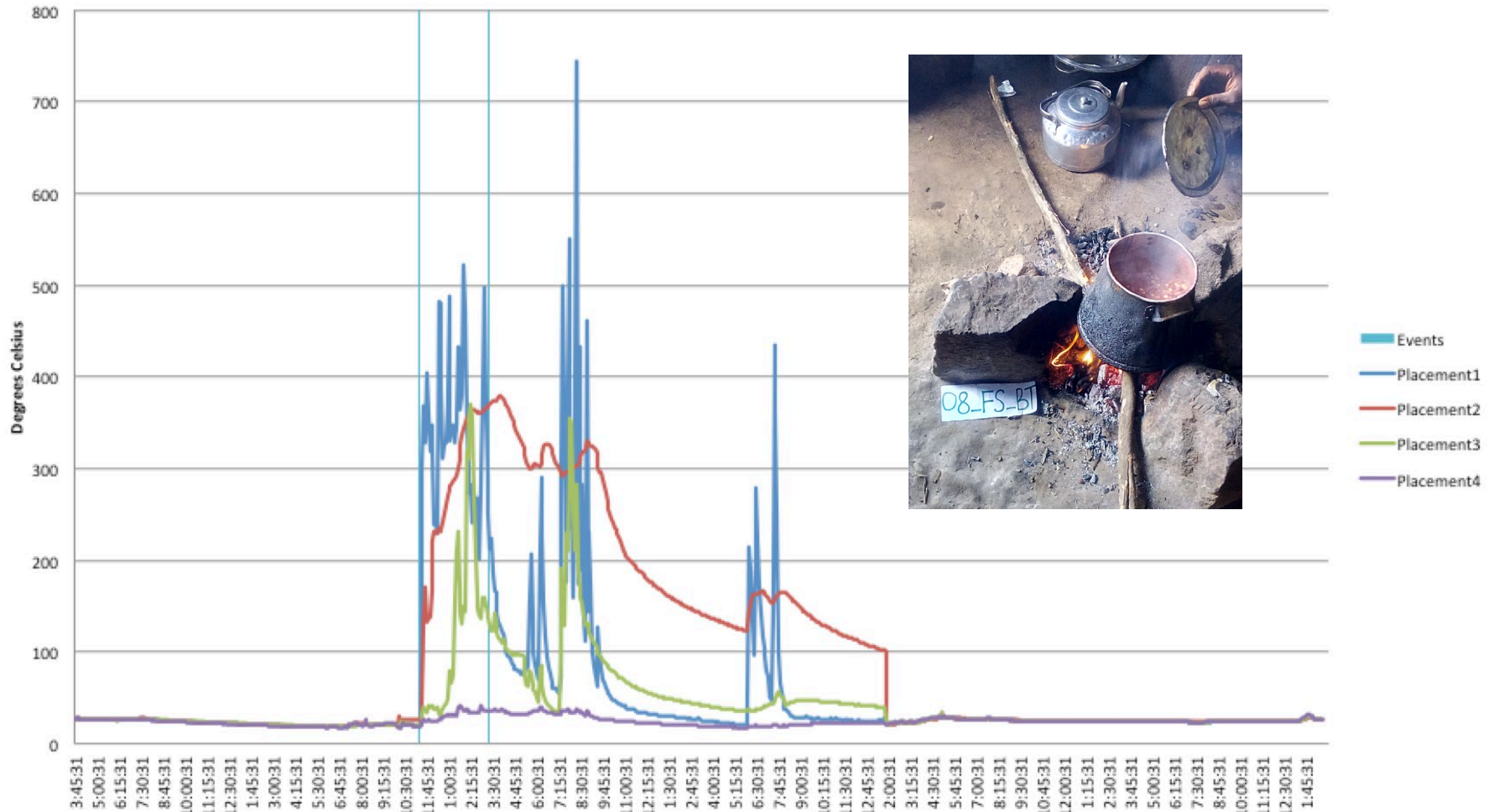


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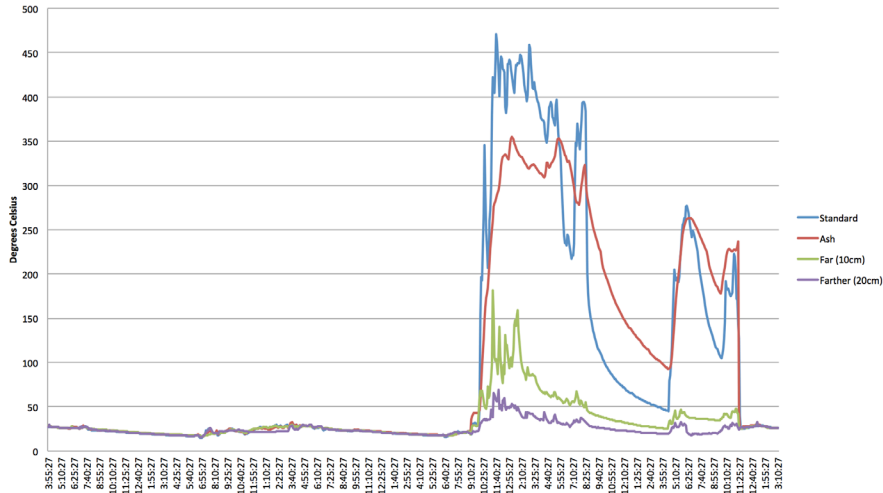




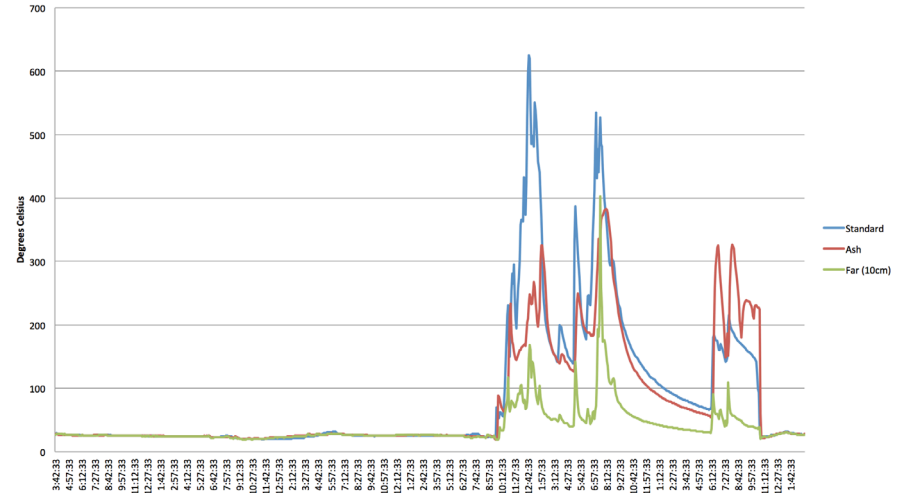
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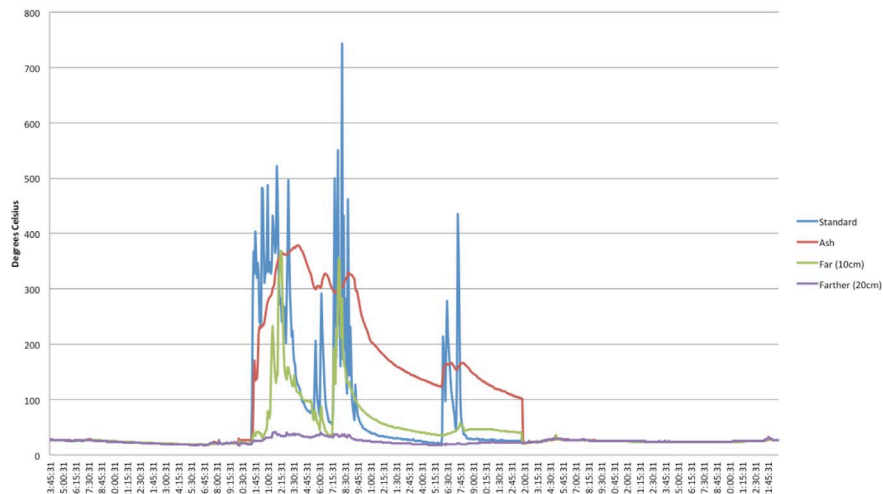
01DAGT



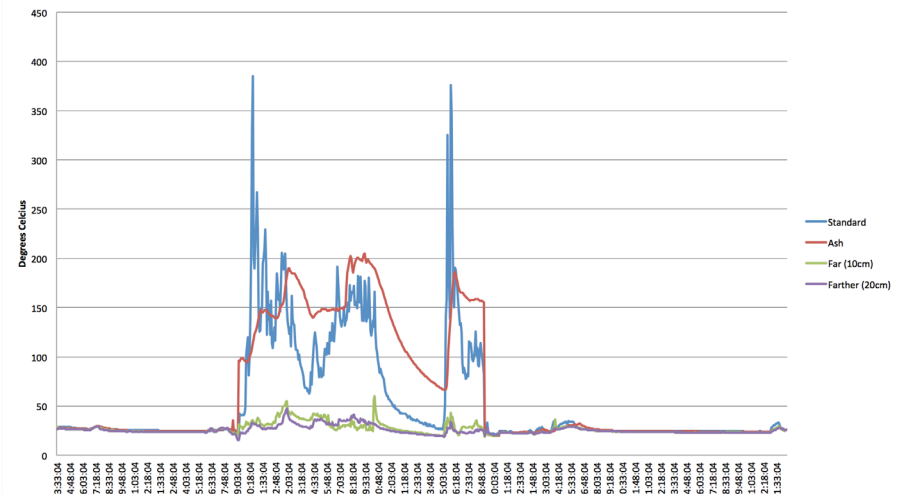
02HMBT



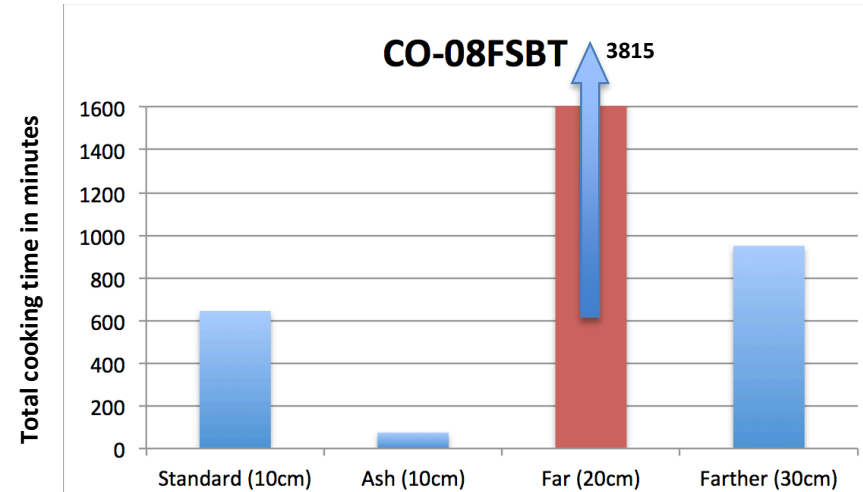
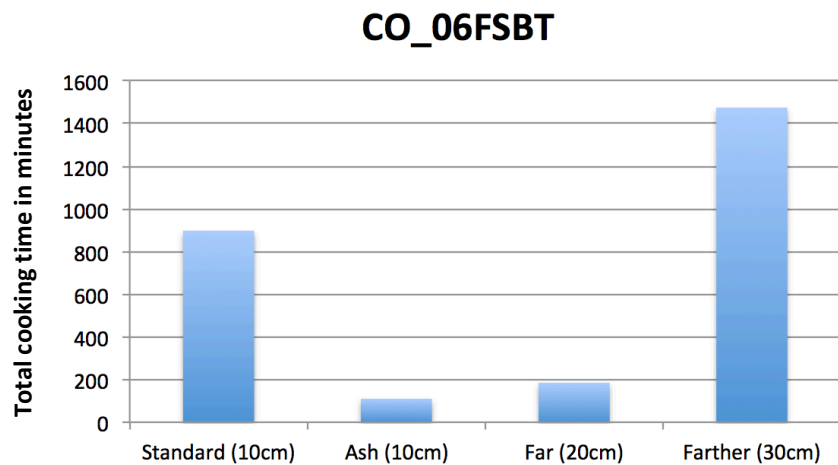
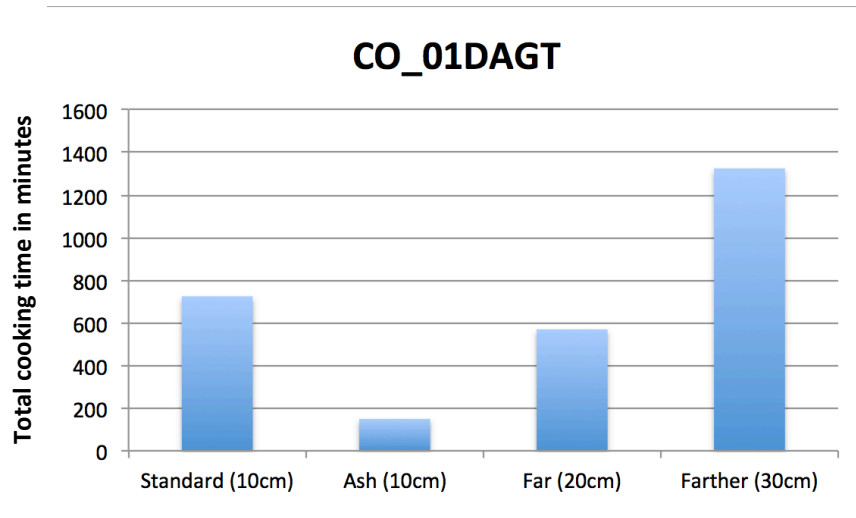
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06FSBT

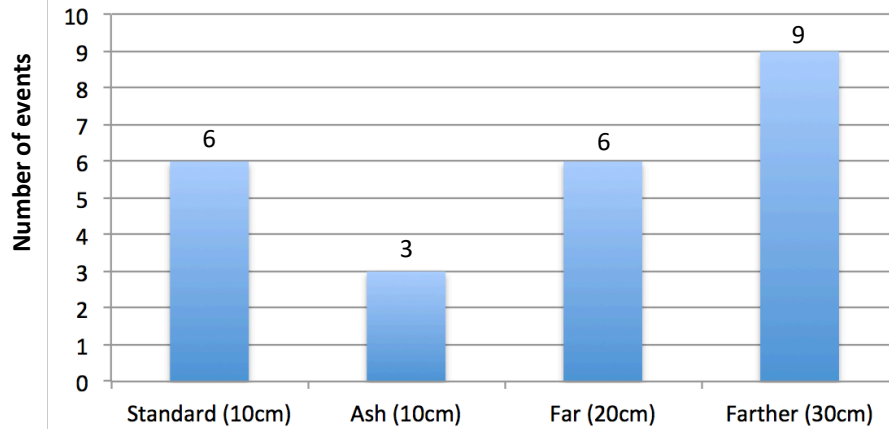


Total Cooking Time

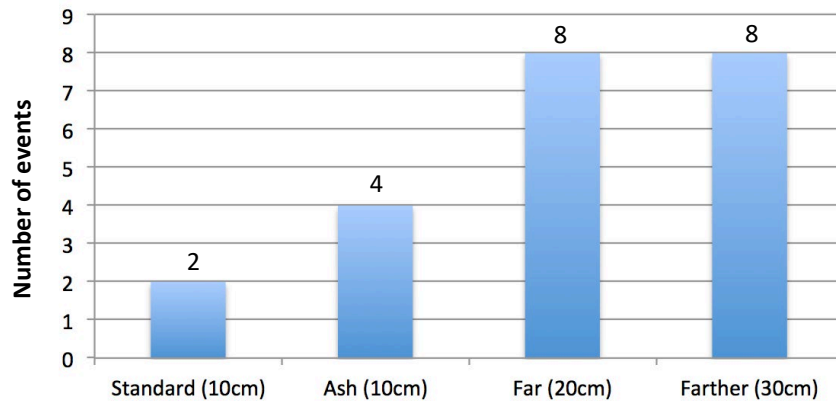


Total Number of Events

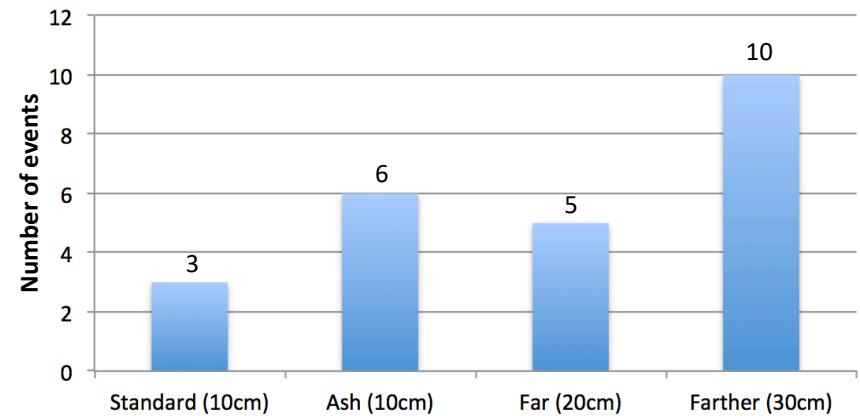
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Take-aways

- Sensor resolution and responsiveness can be evaluated and manipulated to better understand how cooking activities are reflected in temperature traces
- Familiarity with our temperature traces allow us to sort our data so that analysis, manual and ML, is consistent
- Familiarity also allows us to troubleshoot from afar
- Standard placement looks good! Ash and distance introduce unpredictability
- Data collection methods work best with the buddy-system