ARM ASR PI MEETING

Argonne NATIONAL LABORATORY

OPEN INSTRUMENT SCIENCE IN CROCUS AND HOW IT CAN HELP ARM

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ON BEHALF OF TEAM CROCUS AND TEAM SAGE

U.S. DEPARTMENT OF ENERGY Argonne National Laboratory is a U.S. Department of Energy laboratory managed by UChicago Argonne, LLC.

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THE LEDE

CROCUS as an open science incubator.

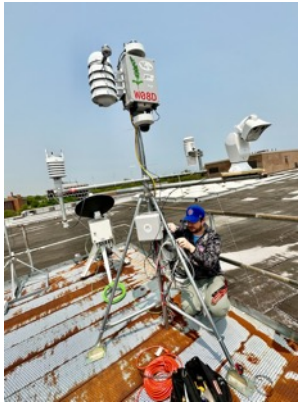
CROCUS
Community Research on
Climate & Urban Science

- CROCUS and ARM share many similar measurements.
- By being open CROCUS aims to write the blueprint for urban science.
- CROCUS includes hardware and edge computing.
- CROCUS can help with R2O for ARM.

MEASUREMENT STRATEGY

Four components: Micronet, field campaigns, public data & citizen science.

Chicago Micronet
Network of 21 observatories.



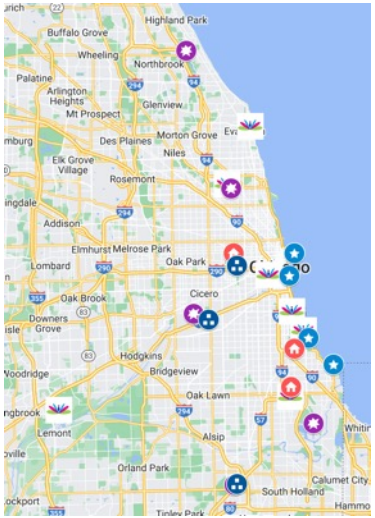
Field campaigns, bringing the most advanced instrumentation to Chicago.

Students involved throughout! Developing the diverse workforce of the future.

THE CHICAGO MICRONET

Understanding variability across the city.

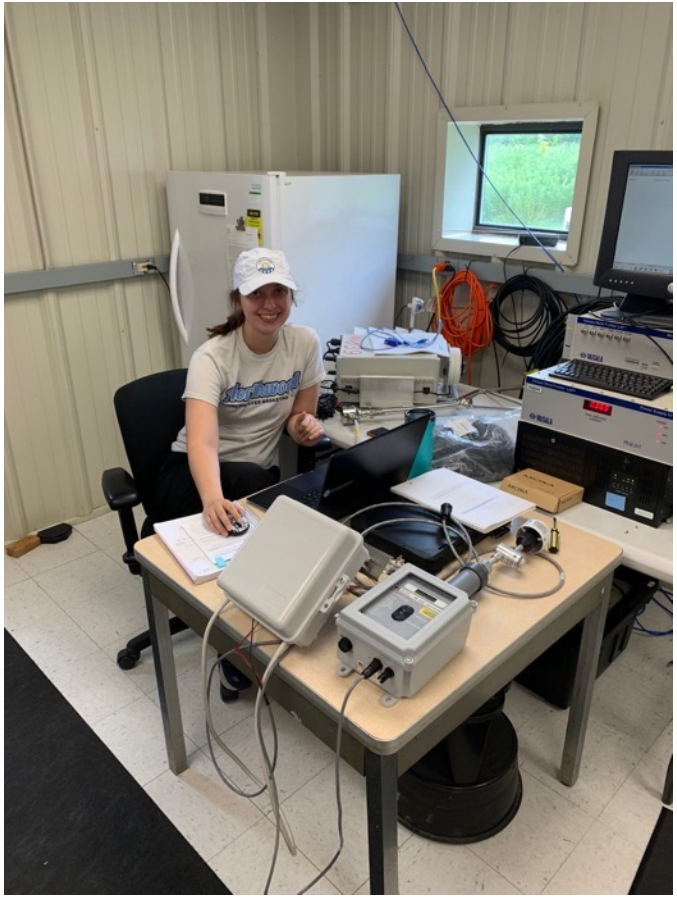
- A network of 21 sites across Chicago.
- Three levels of complexity. All have air quality and meteorology, four will have LIDARs giving vertical structure. Two will have radars for precipitation.
- Work horse sensors at the Vaisala AQT and WXT. These have a serial interface and are calibrated. The AQT gives information about particulate matter and precursor gasses. The WXT gives high frequency meteorology up to 10Hz.



CROCUS IS OPEN

Writing The Blueprint For Urban Science.

- CROCUS touches the full science lifecycle and beyond.
- This allows us (us being open science advocates) to expand beyond data and code and look at hardware.
- CROCUS is built on Waggle hardware and Sage cyberinfrastructure.
- This allows us to publish instrument codes on the Sage Edge Code Repository.



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rjackson / mrr2

Plugin for transferring and processing Micro Rain Radar 2 data

https://portal.sagecontinuum.org/apps/explore

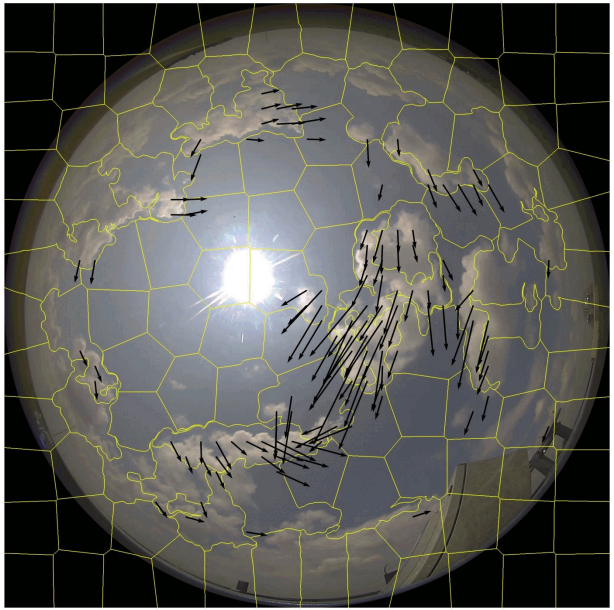
bhupendraraut / cloud-motion

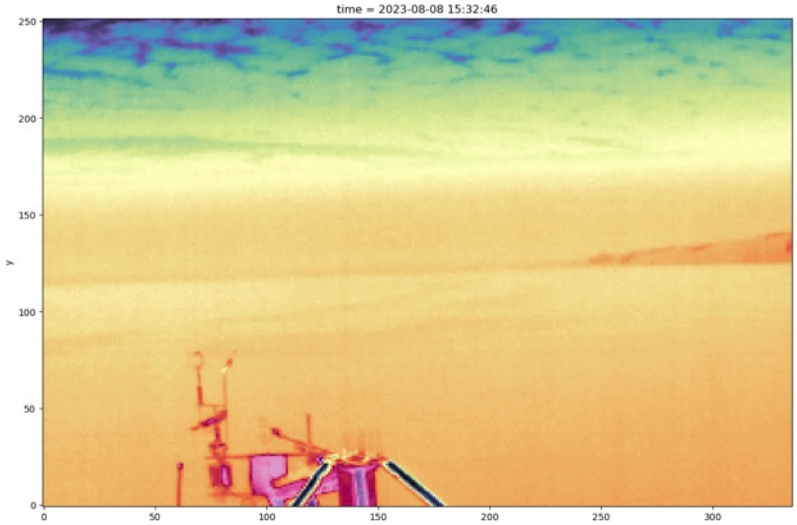
Cloud Motion Estimator (Optical Flow) for the Sky Camera. Uploads images occasionally.

CONTRIBUTING AND USING OPEN SCIENCE

By using Waggle hardware and Sage CI we get access to apps. These same apps can run on ARM.

- We are already using some of the apps in the edge code repository for CROCUS.
- Any apps we write can also be run on Waggle nodes at EPCAPE and the SGP.
- We have apps in development for working with CL-61 data, MRR and beyond.

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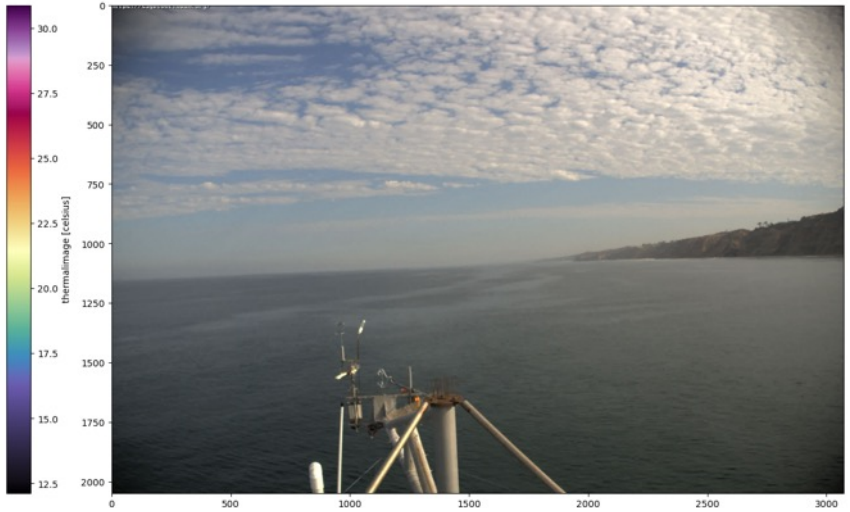
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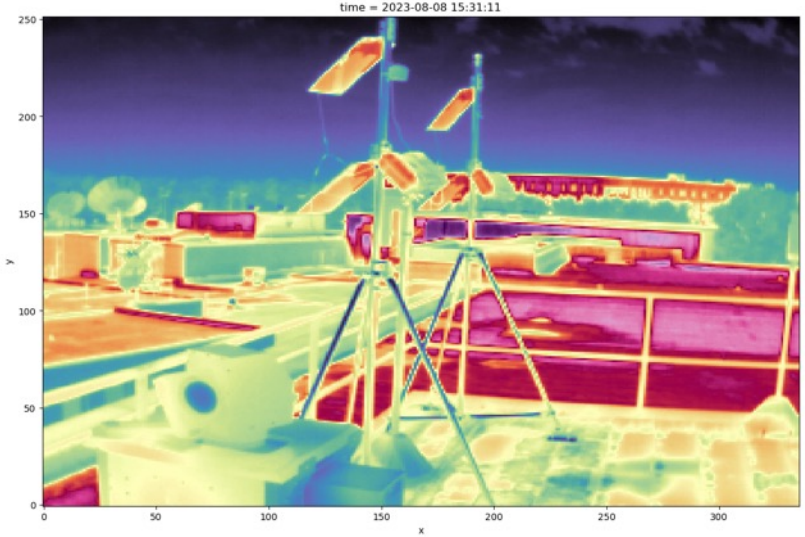
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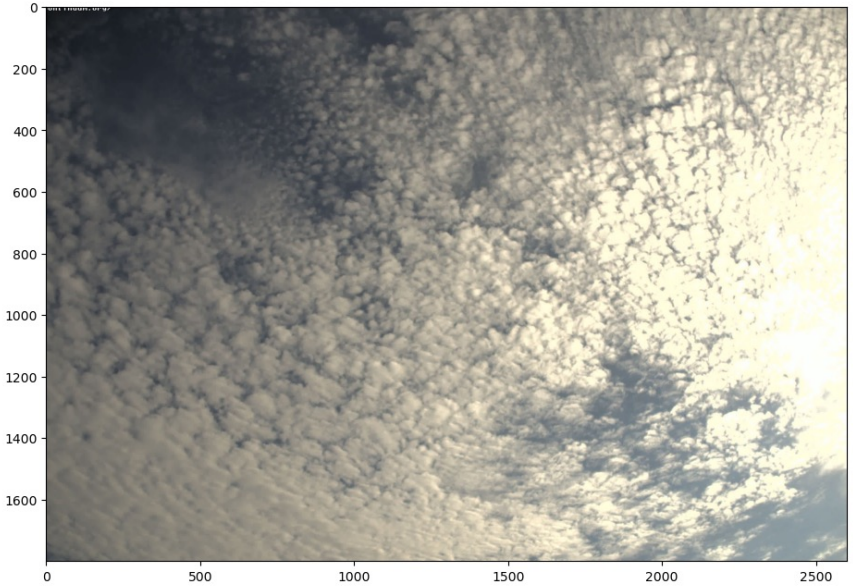

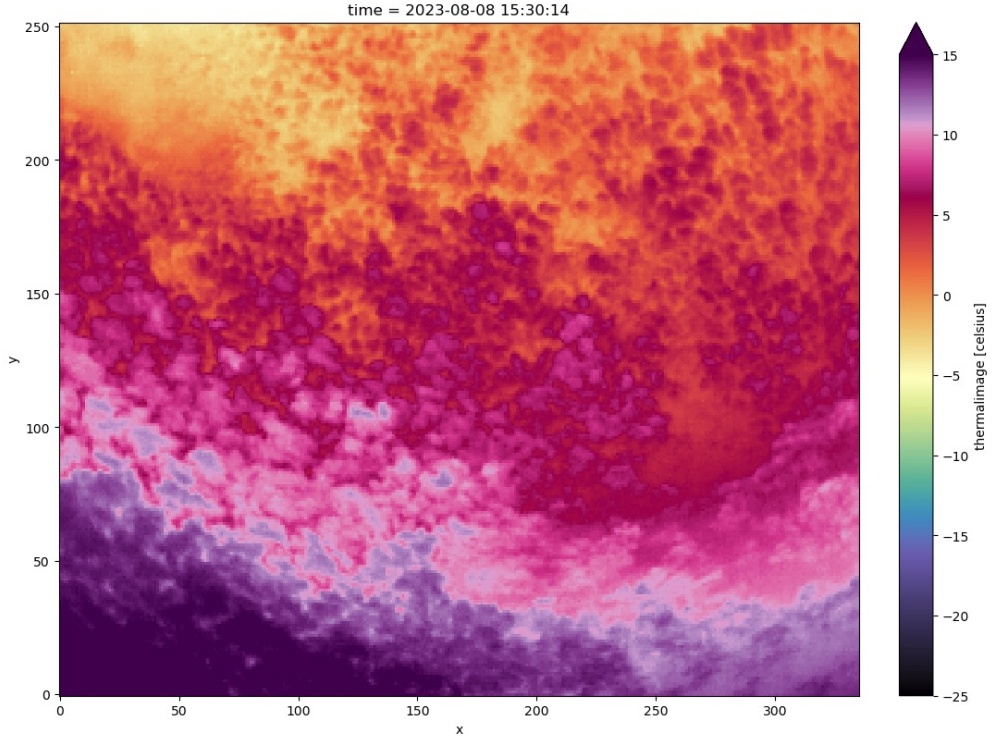

https://crocus-urban.github.io/instrument-cookbooks

COOKBOOKS

And a JupyterHub is coming.

- As we develop ingests, quicklooks and head on into science we publish code as cookbooks.
- These help kickstart others using our data (coming to a THREDDS server near you).
- We are also using these for our workforce development efforts.

https://portal.sagecontinuum.org/query-browser?nodes=W08D&apps=registry.sagecontinuum.org%2Fjrobrien%2Fwaggle-aqt%3A0.23.5.04.*&start=2023-08-08T05%3A01%3A00.000Z&window=2d&names=aqt.particle.pm2.5

CROCUS

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