

Leader: **Vladimir Anisimov**, Co-lead: **Andrew Kruczkiewicz**

Google docs note taker: ---- (*determine in group*)

Presenter brief summary: ---- (*determine in group*)

Logistics:

- Spend 5-minute max to do a quick introduction among all in your group (name, what institute do you work for)
- Determine who takes notes and who will present a summary of the outcome of this breakout this afternoon.
- Make small subgroups (3-5 people) and answer each of the questions below. Take for each question ~15-20 minutes in your small subgroup and brief back to larger breakout group (~3-5 min each subgroup) for the note taker to capture into google doc.

TASKS - IN-SITU or CITIZEN SCIENCE

Inexpensive new in-situ sensor technology enables a citizen (crowd-sourced) science to be defined. This can help many communities better understand data & models, get involved, increase preparedness as well as resilience to floods. What is the current state-of-the-art of in-situ sensor technology & citizen science and how can this be integrated with flood risk models & EO data?

- 1) Define Citizen Science. What are examples of Citizen Science efforts being done related to floods?
Using citizens for data collection either through operation of devices or simply reported
Premise Data uses surveys to respond to specific questions
Online, social media could be one source
Gruntify in Australia has people sign up to "officially" report hazards
In the UK there is a startup within the insurance industry provides incentives to collect precip/flow (not necessarily public at this point)
Globe.gov
E.g. CoCoRaHS, mPing
- 2) Define your citizen
 - a) What is your location? River in Russia.
 - b) What is your gender? Female, 40 years old. American?
 - c) What is your biggest challenge? Working the land in adverse conditions. And providing enough food for the long winter in your daily?
 - d) Describe your day. Wake up before the sun, milk the cow, get kids ready for school. Your day.
 - e) What kind of technology do your smart phone have access to?
 - f) Do you speak English?
 - g) How are you affected immediately and personally by floods?
 - h) Describe the type of flood you are most affected by? Riverbank bursting?
 - i) What other questions are missing here, Education, (high school level), interests, climate, social challenges she faces. What may be important?
 - j) How is your mobility impacted?
 - k) What is your motivation to get involved in the citizens?
 - l) How connected you are with someone who knows about flooding or involved in emergency management activities?
 - m) How do you think you can help during flooding in terms of providing information?
 - n) When can you get involved in community activities to help with flood event response?
 - o) Do you feel civic responsibility to contribute to your community's well-being?

Group 1

p) Sri Lanka?

- q) Female (Adult)?
 - r) Economic/Food Security (financial instability/volatility)?
 - s) Start work around 7:30 and work until dark. Use a backpack to pluck/store tea leaves and make immediate decisions about quality.
 - t) Smart phones?
 - u) Some speak English, but it is not universal?
 - v) Can't work, damage to infrastructure no provision for income loss, could be damage to crop which is also a problem for drought?
 - w) Pluvial flooding is predominant?
- 3)

[group2]

- a) What is your location?
- b) What is your gender?
- c) What is your biggest challenge in your daily?
- d) Describe your day.
- e) What kind of technology do you have access to?
- f) Do you speak english?
- g) How are you affected by floods?
- h) Describe the type of flood you are affected by?
- i) What other questions are mis
- j) sing here, but 2]

[group 3]

Define your citizen

Adult citizen with an interest in science. With a cellphone and literate.

- k) What is your location?

Rural United States

- l) What is your gender?

Any gender any age.

- m) What is your biggest challenge in your daily?

Working, making money, scheduling, moving from home - work,

- n) Describe your day.

Kids, commute, work, groceries.

- o) What kind of technology do you have access to?

Cellphone, internet

- p) Do you speak english?

Yes

- q) How are you affected by floods?

Flooding of crops, water quality, requested of flood maps in a short moment after occurring

- r) Describe the type of flood you are affected by?

- s) What other questions are missing here, but may be important?

[group 4]

Citizen - 60+ year old female who is a retired banker. She speaks English, and spends time with her grand-children.

She leaves outside of Mumbai, and gets impacted by flooding during monsoon season due to urban flooding.

Basically, she cannot go out and play with the children in muddy condition. She wants to participate through citizen science efforts to help with flood forecasting and response.

- 4) What efforts based on citizen science are being done in your location?

Four schools in Sri Lanka are participating in Globe.gov

The National Meteorological Service runs a program using tea leaf gatherers to take pictures of stream gauges on their smartphones and then weekly an agent collects the pictures and records the records that become a part of the national database.



Premise/Gates has a project to help identify the state of healthcare (facilities, immunization, quality of care, etc.)

[group 2]

[group 3]

Globe.gov

Citsci.org

Cocorahs

<https://www.streamtracker.org/>

[group 4]

Satark Landslide Warning Facility for Center for Citizen Science (Pune). They use satellite imagery for landslide forecasting and monitoring, and citizens to obtain reference data.

5) Citizen Science Slam

60 seconds for the best - 1 or 2 clear points

60 seconds for the worst - 1 or 2 clear points

Positive: A historical record in locations that would otherwise be unreachable. Generally citizen awareness and understanding is raised.

Negative: During an extreme event (when they are not collecting tea leaves) they will not be recording the gages. This is not intended as a warning system. Reliability, accuracy are impacted because their primary motivation is not science but rather the supplementary income they receive.

[group 2]

[group 3]

Best

Cocorahs is consistent, validated, regularly measures the same location.

Worst

Not consistent water surface measurements. Many have few observations, not repeated at the same location. Most are not dedicated to floods, so don't give useful information on impacted routes from/to work, impacted crops, etc.

Vulnerable to bad actors. Hazard for the citizen when collecting observation and access to the site.

Would be nice to have Ice observations, ice/no ice.

[group 4]

Best - You can make a difference and participate anywhere anytime

Worst - If not enough citizens are involved, then the accuracy can not be validated from receiver end. If there is no incentive or feedback, then not many citizens will be engaged.

- 6) Suggest improvements, opportunities, how to take this critique, and develop a draft guidance document:

Key considerations for developing flood related citizen science tools

What's in it for me (the citizen)? Income, livelihood, personal satisfaction are all reasons, but this will work best where intrinsic motivations are the primary motivators for them to participate.

[group 2]

[group 3]

Motivated by the relevance of the data to me and community, but worried about continuity of the service. Feel like I'm contributing to the community. Motivated also by possible rewards, such as points, etc. Would be more motivated if I had a choice on what I can report, at least by having a field where I can add what I care about in addition to what the PI wants. Would be motivated if there was incentive to acquiring hardware.

[group 4]

Need to see evidence of how the data is being used. How one contribution made a difference? Use an avatar or numbering system to check data usage to protect privacy.

Create a system that allows citizens to enroll and share the data with a centralized system.

Show the citizen how to use the system and what to collect?

Reliability & suspicion.

- 7) What type of in-situ tools need to be developed to either 1. Address gaps identified in the citizen science or 2. Address data gaps in the flood forecasting community (YOU ARE NOT ALLOWED TO SAY STREAM GAUGE OR CELL PHONE) ?

[group 1]

[group 2]

[group 3]

[group 4]

Collect soil samples. But, the data have to be picked up at some central location.

1) What is currently being done/offered for floods?

In Colombia have worked Watershed management two years identify weakness in mitigation, knowledge and alert system.

2) Generally, what are the challenges with crowd-sourced data (e.g. easy integration with EO and model data)?

We have not a system that organized and centralized data, but it be making in differents places in the country, it are called nodos risk.

3) What is the role of AI & deep learning for crowd-sourcing (in relation to floods)?

forecast floods.

4) What can be expected from crowd-sourcing floods in the near future, within private and public sectors?

All social actors are responsible for resilience as responses to negative impacts of the consequences of floods due to climate change.