SEG Student Chapter - TUDelft & BSU

climate change *e*-packages 2018-2019

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Sharing problems

Climate change is a clear and present situation in our everyday life that spans the entirety of planet Earth. As inhabitants of this planet, it is our responsibility to participate in the planing of solutions these changes are making in our lives.

The approach of this project is to teach younger generations how geophysics can be used to solve some of these problems and to raise awareness of the different challenges climate change poses in different parts of the world.

We will do so by developing a series of *e-packages* (described in the next sections) that will be shared remotely between the two universities and that are to be given to an audience of children attending primary and high school. The word "*e*-package" refers to *electronically* sharable package.

The *e*-packages

Each *e*-package has to teach children about a particular issue related to climate change and how geophysics is used to monitor it. The following rules apply to all *e*-packages,

- **Climate change related.** Only issues related to climate change.

- **Geophysics is used.** Geophysics has to be used to tackle the issue.

- **Local issue.** The issue has to be from your (current) locality.

- **Self contained.** Any geophysicist given the *e*-package can teach it no matter where they might be.

- **Sharable remotely.** Communication *only* through the internet is paramount. Each *e*-package will consist of a Jupyter notebook with a pdf write up answering the above questions paired with peer reviewed references, followed by multimedia files (e.g. videos and/or code snipets) that are to be used in the showcase activity.

- **Structured.** All *e*-packages need to follow the following format,
    1. **context:** why does this issue matter to the local community?
    2. **climate change relation:** why is this issue related to climate change?
    3. **geophysical methods used:** what geophysical method was used to monitor it?
    4. **showcase and/or activity:** what do geophysicists actually do?

Example of an *e*-package

This *e*-package will tell the story of snowfall and water replenishment in the Idaho Rockies. **This is a work in progress!**

- **Context.** An important source of fresh water recharge in the state of Idaho is snowfall on the Rocky mountains during the winter that is then transported down to the valleys by snowmelt and gravity throughout the year. This water then serves for planting crops, drinking, cooking, taking showers and producing electricity.

- **Climate change relation.** With increasing temperature extremes throughout the year, it is becoming more difficult to account for the use vs the availability of water. It is therefore important to know how much water is available for the short and long term.

- **Geophysical methods.** GPR skiing and helicopter stuff, digging holes in the snow, machine learning, etc.

- **Showcase.** Video of waves propagating through the snow, pictures of helicopters and skis, onsite GPR demonstration (maybe), lasers through ice, python notebook, etc.

Making friends

As part of the global challenge climate change poses to our planet, we would like to gradually invite other SEG student chapters around the globe to contribute with more *e*-packages and different perspectives.

"Snow melts"

Below is a road map for the first stage for producing the e-package: "Snow melts". Each participant is to elaborate on their section in a concise but accurate way (with citations) the sections mentioned.

The second stage will consist on bringing together all sections below in what will be a draft Jupyter notebook.

Context (Nicole): Idaho water resources depend on snow pack and run off timing. They are important to society because crops and electricity.

Climate change relation (Gabe): Snow pack and run off is one of the most responsive facts to climate change, how does this affect society?

Geophyiscal methods (Tate, Diego): GPR end goal is SWE. SWE is related to electrical properties. Snotel stuff.

Showcase (Tate, Diego): Video of simulated EM waves through snow, example of data, slide bar of 1d layered snowpack and electric properties.

"Snow shakes"

Zongbo thought about this one, ask him.