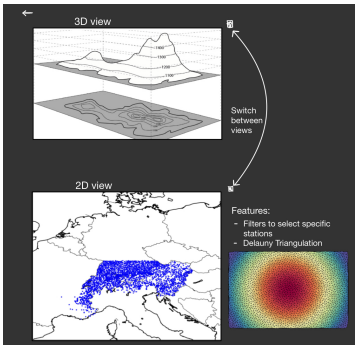
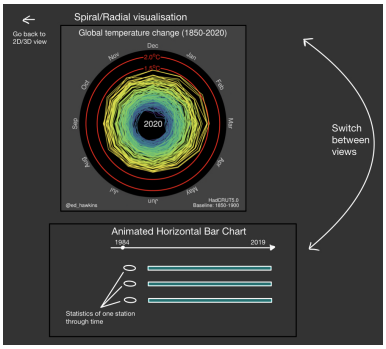
Snow Vision — Milestone 2

Visualizations

We plan to create multiple visualizations for our project:

- A (topographic) contour map (plotting height lines) that shows the locations of all available stations.
- A Voronoi map where we draw an area around each station. Here, we wish to color encode snow depth and color the respective areas according to the measured depth. The user will be able to choose for which year/month data is shown.
- A radial line plot where one revolution is one year. Here, we show snow depth at a given station over time. We wish to animate the plot, i.e., the line is drawn continuously such that the user can follow the evolution of snow depth over the years.
- A bar graph next to the line plot. This graph may contain, e.g., the snow depth and amount of snowfall for a given month. It may show more information, if necessary.





Tools and Lectures

We use the following tools:

- *D3*[1] for all visualizations.
- *Python*[2] and *Pandas*[3] for preprocessing the data and generating suitable CSV files.
- *UIKit*[4] as our CSS framework.
- Maybe we will use *three.js*[5] if required for drawing a 3D topographic height line map.
- Our current preview of the radial line chart uses *Chart.js*[6].

Additionally, we use the following lectures:

- *Perception Colors* — This lecture will help us decide on how to color-encode snow depth, in particular in our Voronoi map.

[1] `https://d3js.org/`
[2] `https://www.python.org/`
[3] `https://pandas.pydata.org/`
[4] `https://getuikit.com/`
[5] `https://threejs.org/`
[6] `https://www.chartjs.org/`

- *Map* — This lecture will help us to design the underlying map where we show the locations of our stations.
- *Tabular Data* — This lecture contains some useful information on radial plots that we might incorporate for the plot showing snow depth over time for a single station.
- *Storytelling* — This lecture will help us to structure our overall story and to design the "flow" of information that we want to show.

Project Breakdown

All the visualizations explained above are independent pieces that need to be implemented, besides the website skeleton itself. The site consists of a landing page and a visualization page. The visualization page is more complex; it initially shows a map with the locations of all the stations, and it allows selecting a station to see detailed information about it. Furthermore, the single-station view containing information about a selected station is another independent piece to implement. All these pieces are required for the project.

If we have enough time, we may try to create a 3D version of the radial line plot. For this, we would take inspiration from climate spirals[7]. Furthermore, we would try to draw the contour map in 3D. However, if we do not achieve this, the project will not take any damage.

Functional Prototype Review

Our landing page displays the title of the project. In the background, there will be a full-screen faded video (to be chosen in the context of snow melting). At this point, the user is prompted to either start watching the visualizations by clicking on a button in a corner of the screen, or learn more about the context and motivation of the project by clicking on a button on the bottom of the page.

When choosing the second option, the page shifts to the storytelling section, where images, analysis from experts and personal considerations inform the reader about the importance of the topic. At the end of the storytelling, the user is prompted to move to the visualization page.

The visualization starts with a geographic overview of the station's locations. The user can switch between a topographic height-line contour map and a Voronoi map, as explained above. Another button will allow the user to move back to the storytelling. When selecting the Voronoi map, the user may select a year and a month, e.g., by moving a slider. The cells of the Voronoi map will then show the snow depth measured by the respective station, encoded with a color.

By clicking on a station on the map, the user may get more detailed information and measurements from the respective station. Here, we show the radial line plot and the bar graph, as explained above. By clicking on a button, the user may move back to the geographic overview and select another station.

Please also refer to the skeleton website available in our GitHub repository. This skeleton contains the basic structure of the page. It starts with the landing page and then moves to the map page. From here, it moves forward to the single-station view. On all pages, we included the positions of the visualizations as well as their type and a short description. The page `map.html` contains a map of central Europe with all station locations. The next step here is to overlay Voronoi cells and color them according to the station's measurements. To properly see the pages, please run a local web server in the root directory of the website (e.g., using `python3 -m http.server PORT` and connecting to `http://localhost:PORT/`).

[7] `https://www.climate-lab-book.ac.uk/spirals/`