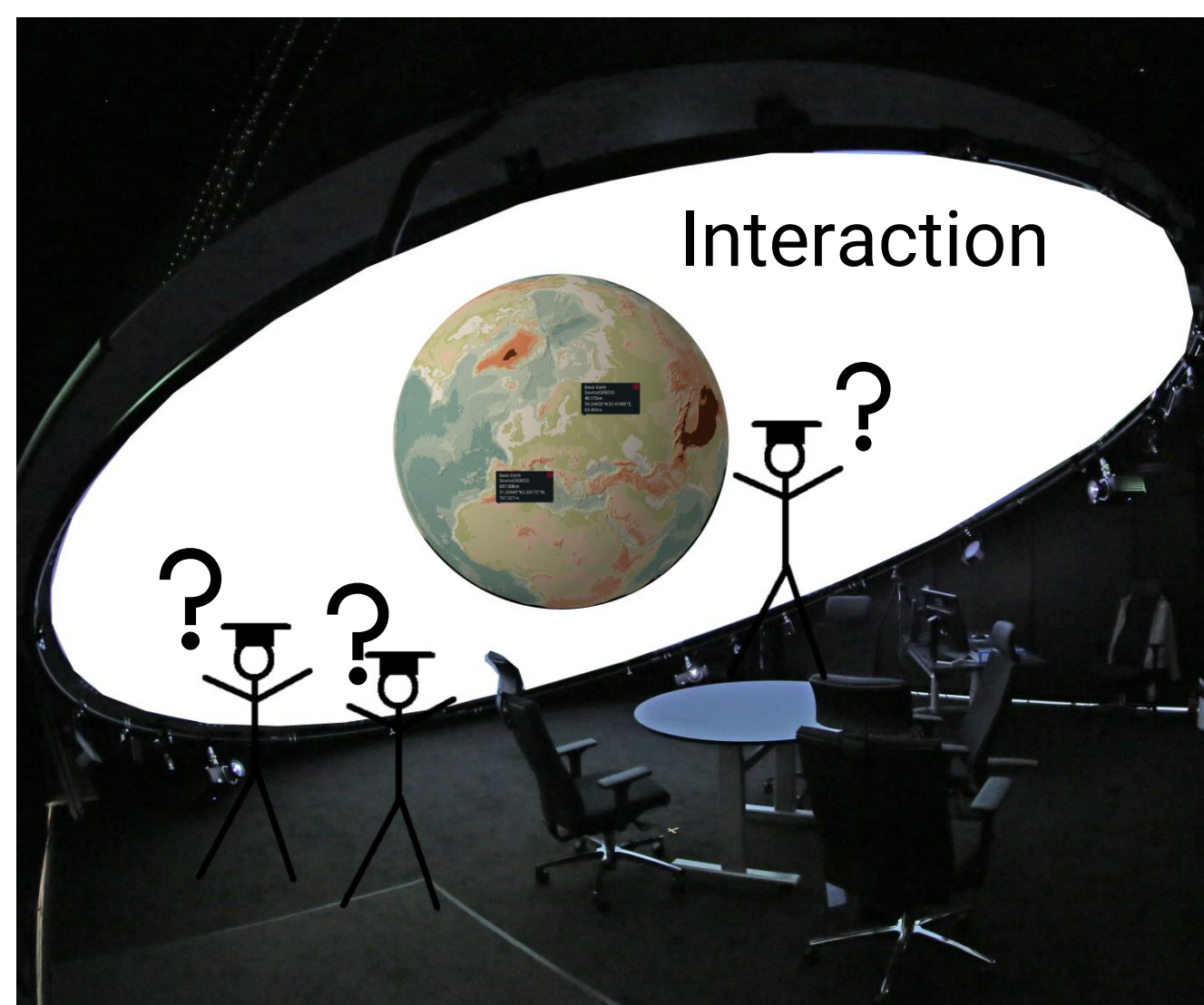


The Digital Lab Book:

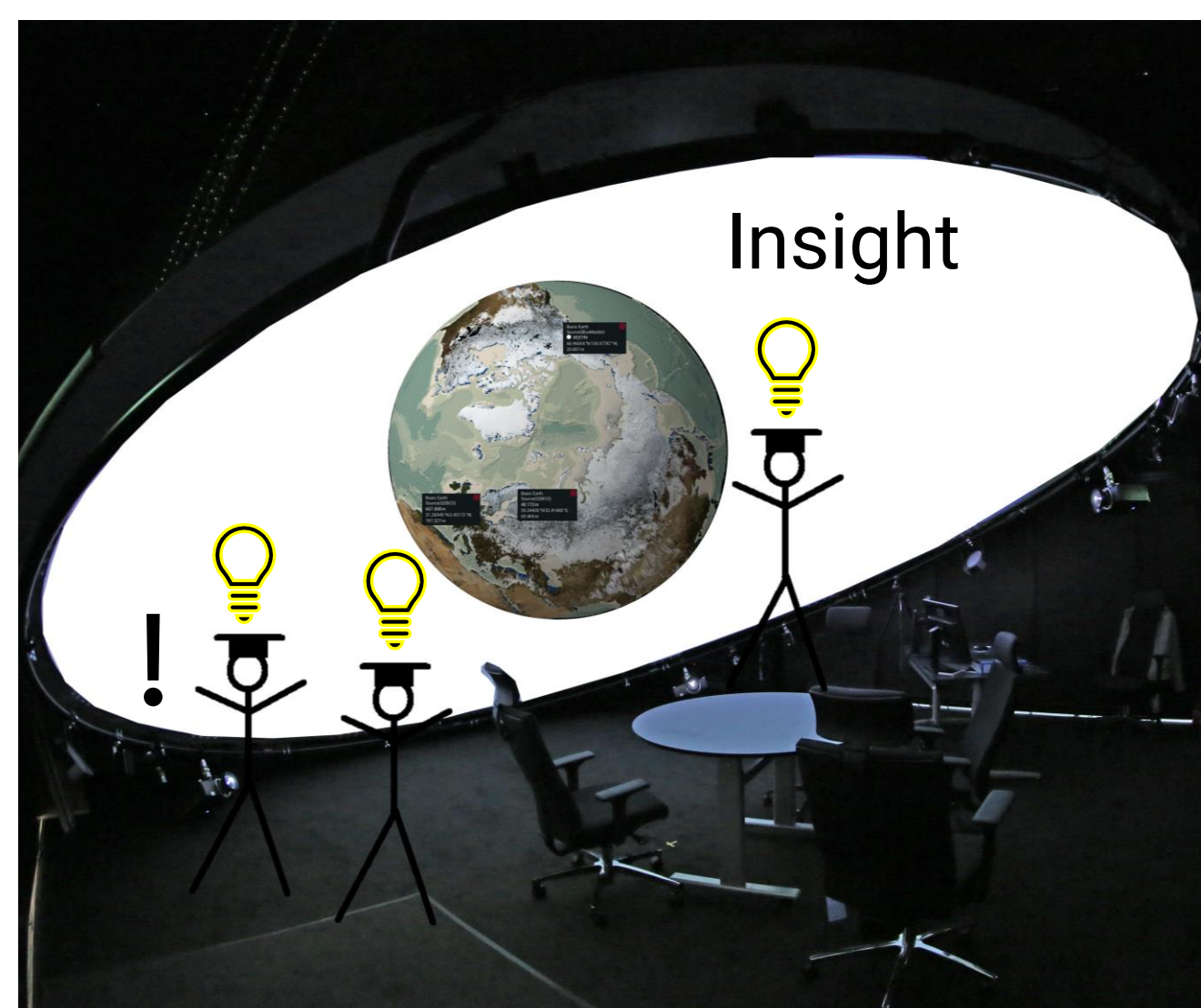
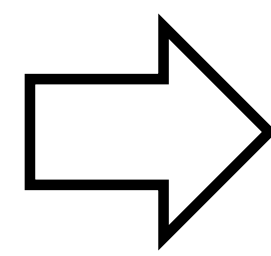
Reproducible Visualization = Better Science!

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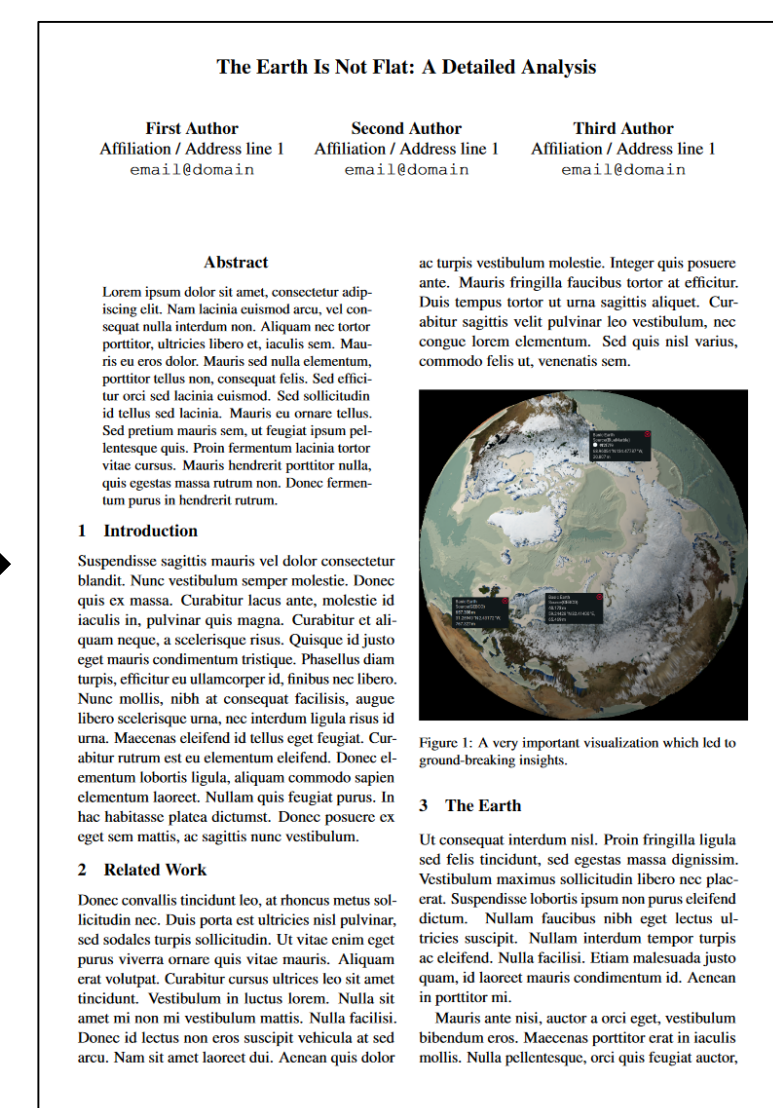
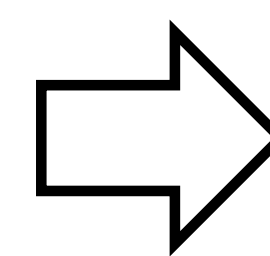
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Step 1: Collaborative and interactive visual data exploration. For example in an immersive setting (ARENA2)



Step 2: Insights and knowledge have been gathered through a sensemaking process. A visualization was produced



Step 3: Insights and visualization have been published

Fig. 1: A fictional process of visual analytics from visual data exploration to publication of insights and visualization.

What's the problem?

- How did the scientists arrive at the published insights?
- How was the published visualization produced?
- How can this process of sensemaking and visual analytics be made more transparent and traceable?
- How can the value of the produced visualization be assessed?
- What artifacts of immersion, collaboration, and interaction are important for the reproducibility of (immersive) visual analytics sessions?

„The process is often just as important as the product!“

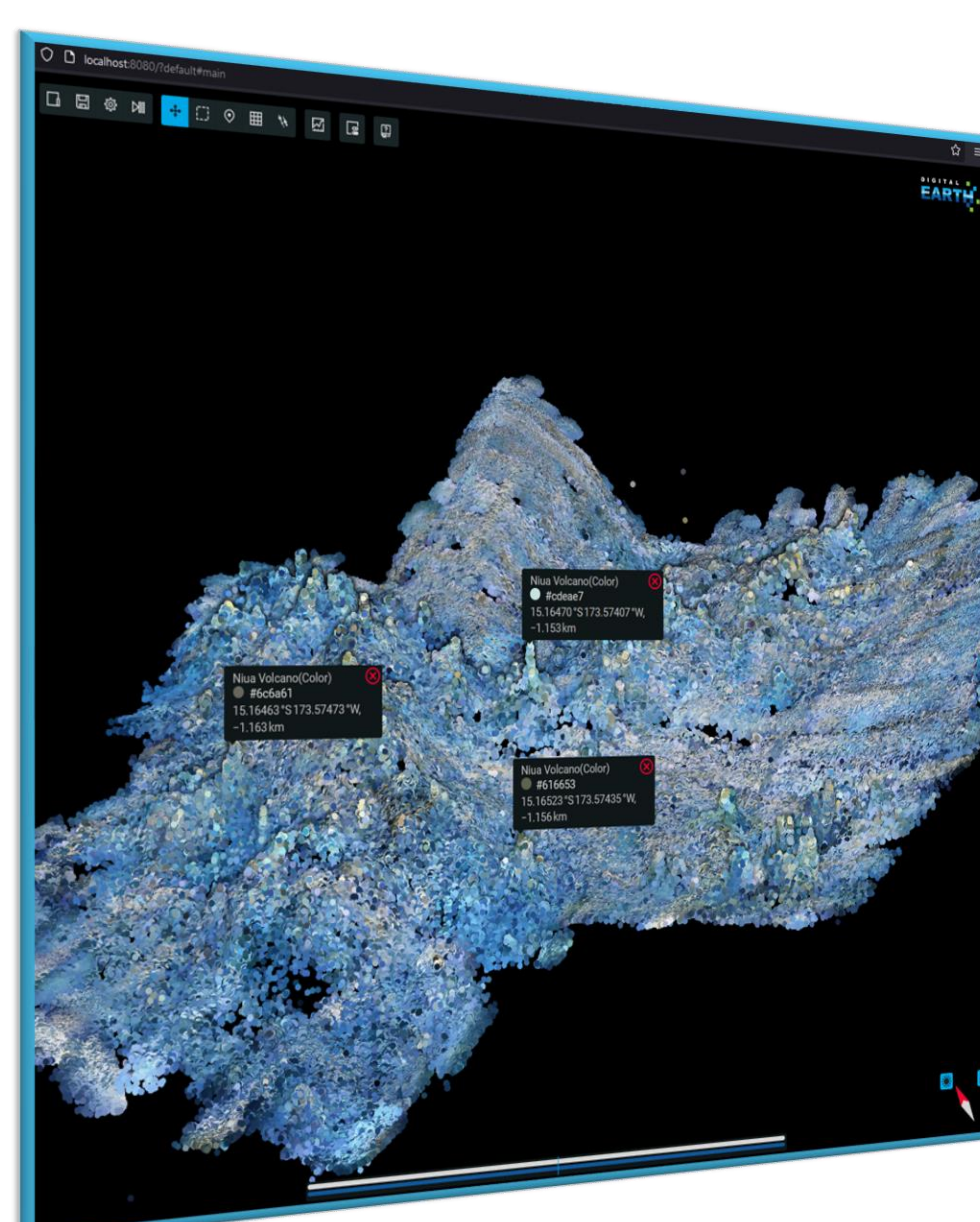
Provenance is the trace of actions and intermediate artifacts throughout a scientific data processing workflow.

Here: [The history of interaction with visualization software in a scientific sensemaking process.](#)

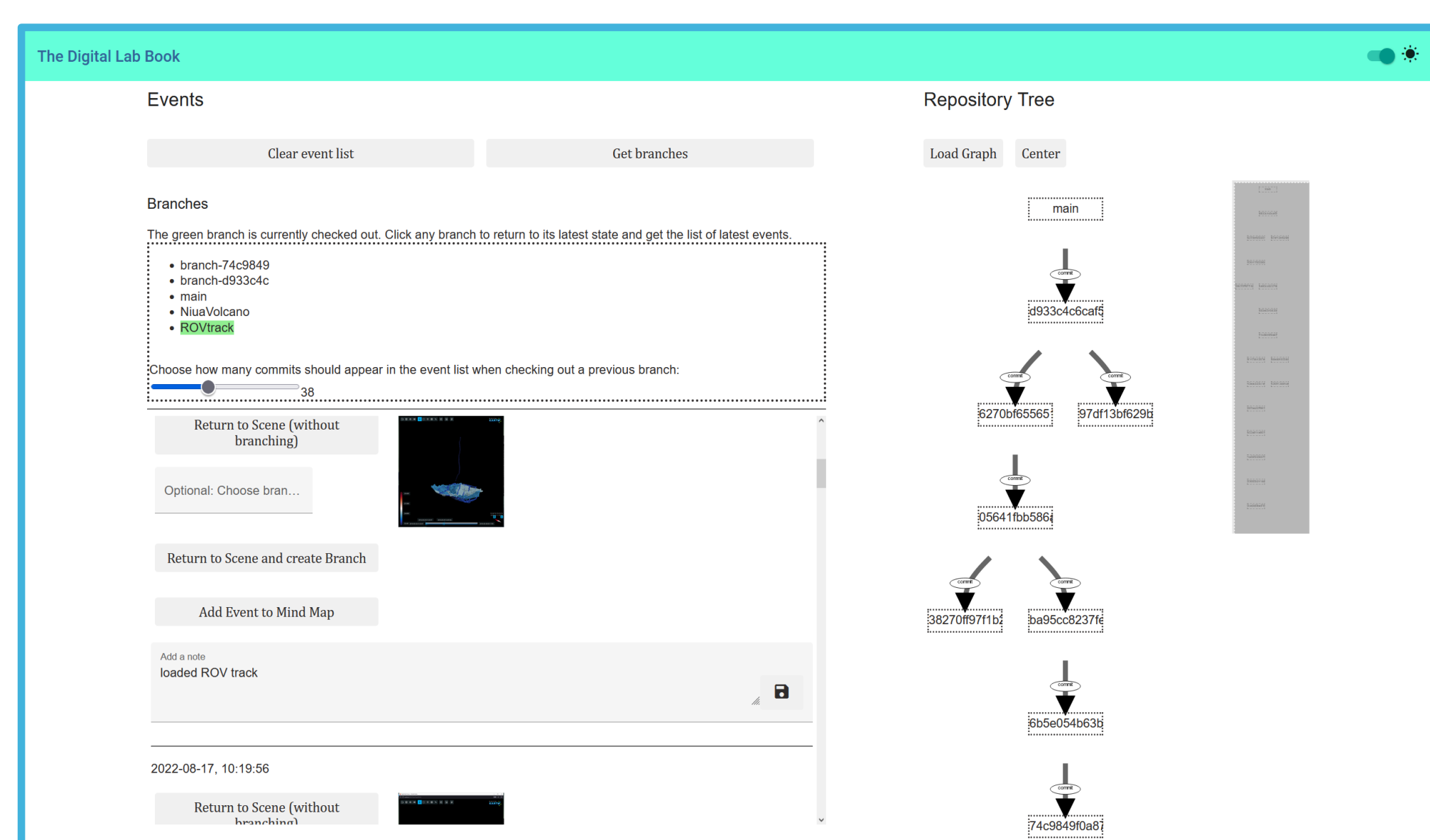
Goals

- Identification of **provenance** artifacts in collaborative, immersive data visualization and visual analytics workflows
- Implementation of a **provenance** visualization and management tool to record and support interaction with visualized data in visual analytics workflows. A specific focus lies on immersive visualization inside the ARENA2 at GEOMAR
- Evaluation of the developed tool in user studies with domain scientists to assess its worth in real-world scientific work.

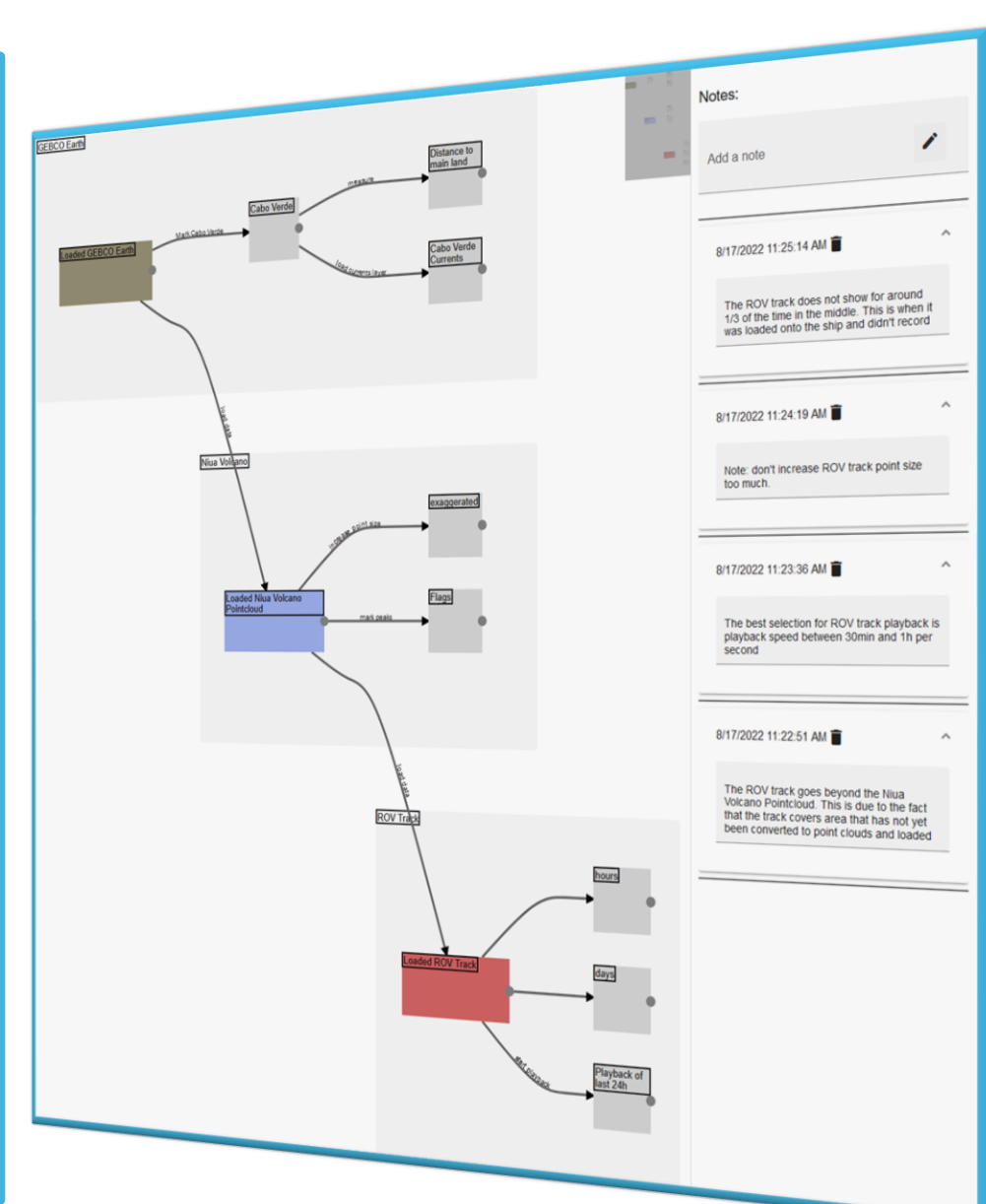
The Digital Lab Book: Web-Based **Provenance** Tool



a) The Digital Earth Viewer, one of the visualization applications currently supported by the Digital Lab Book. The visualized data is a point cloud of an undersea volcano field including user annotations.



b) Part of the main Digital Lab Book web application. On the left side: A list of visualization states/events including screen shots, several user interface elements, and a list of the branches in the current project. The right side shows part of the current provenance graph/history.



c) An exemplary mind map built in the mind map component of the Digital Lab Book resulting from an interaction session with the visualization seen in Fig. 1a).

Fig. 2: Components of the “Digital Lab Book”

Buck et al. 2022. “Visualising geospatial time series datasets in realtime with the Digital Earth Viewer”. doi:10.1016/j.cag.2022.01.010
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