La Palma fieldwork – Exercise 1: Hazard assessment

Volcanic risk module / CERG–C / ELSTE

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Exercise outline

Objectives

Scenario–based probabilistic hazard assessment for Cumbre Vieja for:

→ Magmatic, cone–forming eruption

→ Tephra fallout

→ Lava flow inundation

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Eruption scenario

Low intensity hybrid VEI 3 eruption:

- Plume height: 1–5 km
- Erupted mass: 1×10^{10}–1×10^{11} kg
- Duration: 3–7 days

Lava flows

Modeling

Hazard maps for lava flow inundation using Q-LavHA:

- Uncertainty related to DEM and vent location
- No physics!

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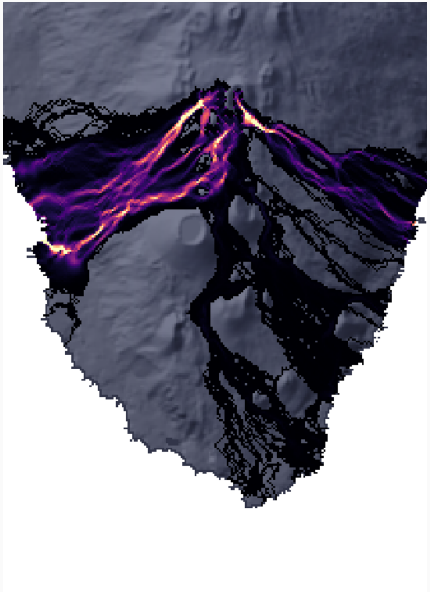
Outputs:

→ Probability maps of flow inundation



Tephra fallout

Modeling

Hazard maps for tephra accumulation using TephraProb:

- Sustained (but unsteady!) ash emissions for 3–7 days
- Variable wind conditions

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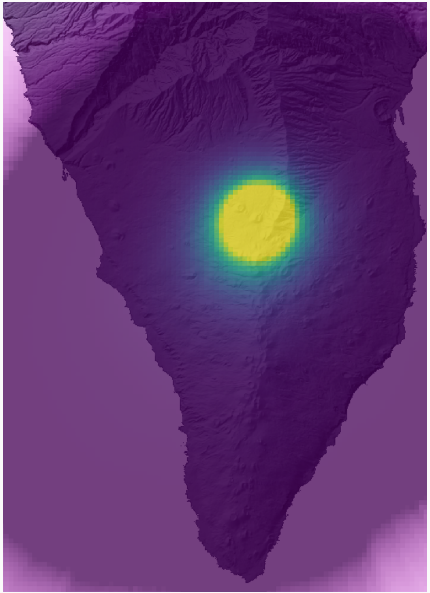
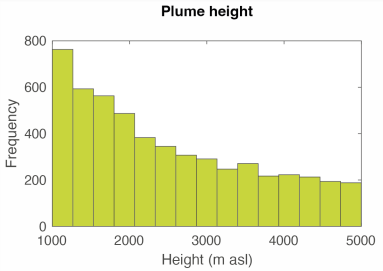
Outputs:

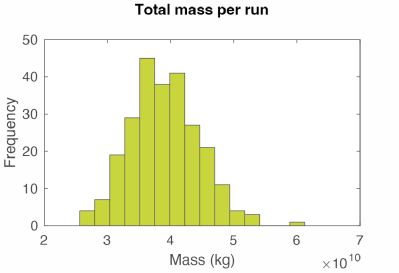
→ Probability maps

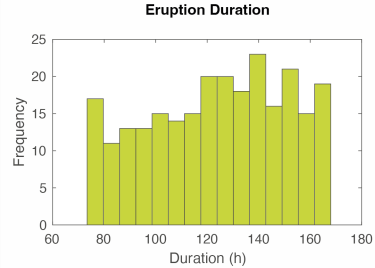
→ Probabilistic isomass maps → 25% and 75%

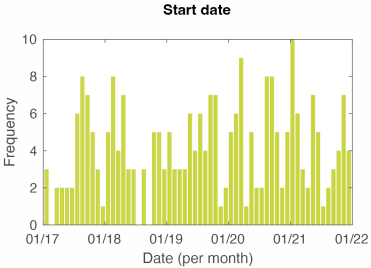


Eruption source parameters









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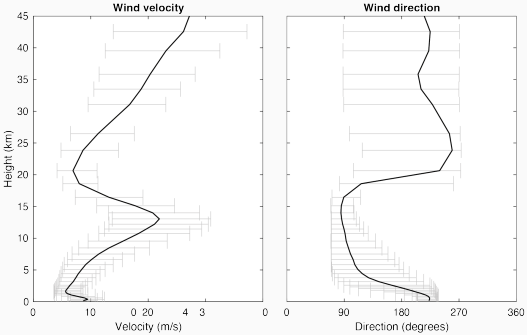
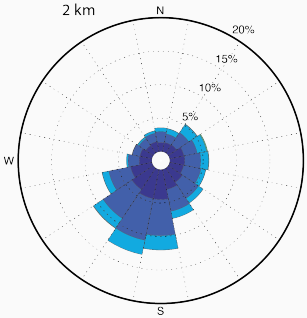
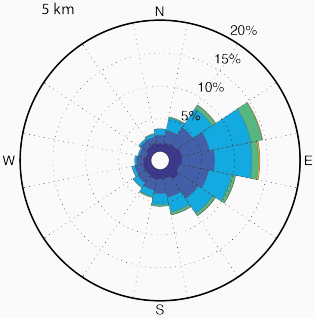


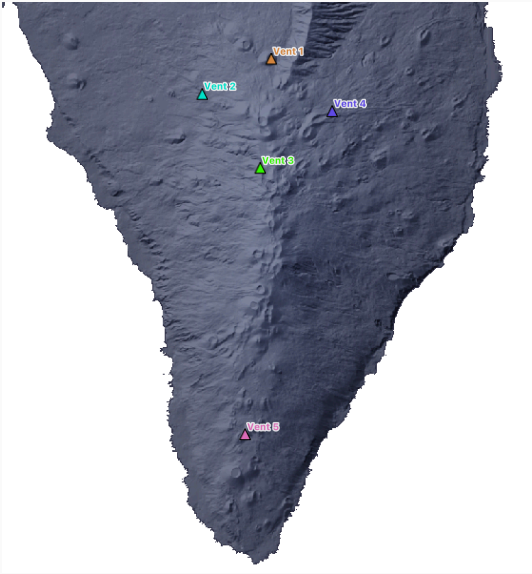




The exercise!

Exercise

Aim: Produce a poster presenting the hazard assessment for your group



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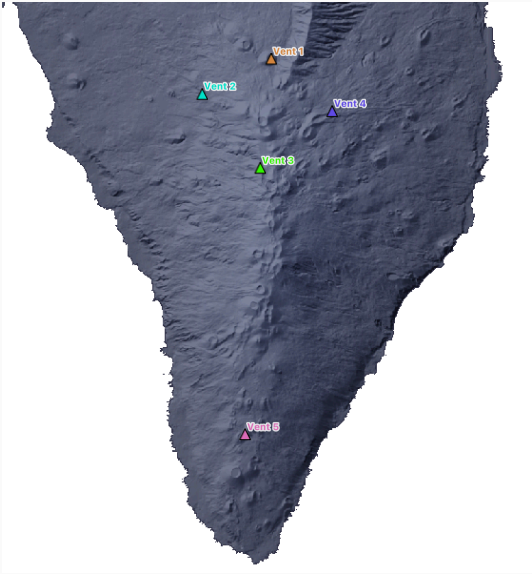
Tephra fallout:

- Probabilistic isomass map for a 25% probability
- Contour the 1, 10, 100 and 300 kg/m^2 isomass lines
- Add any information you might find relevant!



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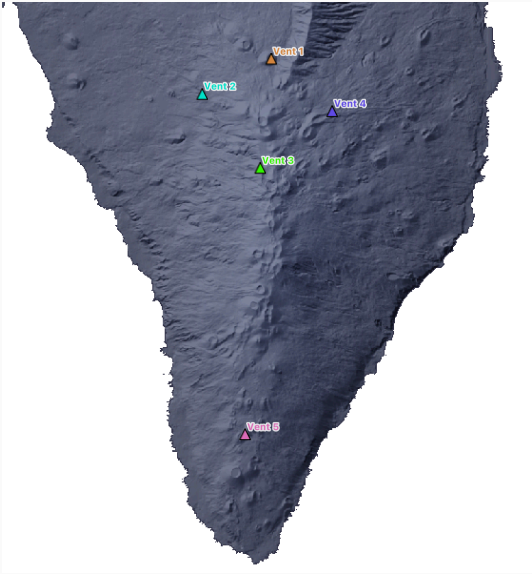
Lava flows:

- Highlight inundation probability
- Be creative!



Exercise

Notes:

→ Data on the USB stick

→ Produce hazard maps on transparent paper

→ Use one sheet per hazard

→ Presentation: 10 min presentation + 5 min questions

Remember!

DEPOSIT ▸ ESP ▸ SCENARIO ▸ HAZARD ▸ EXPOSURE

Groups

Group 1	Group 2	Group 3	Group 4	Group 5
Fernanda	Camille	Monique	Million	Anabella
Mattias	Giorgi	Angie	Ana Maria	Jonas
Florent	Amin	Karen	Génio	Nicolas
Salome	Douglas	David	Sylvain	John
Elias	Mario	Delair	Elise	

Questions

Group 1: Although the models you have used do not account for time, discuss and contrast the spatio-temporal evolution of the selected hazards in the context of a long-lasting eruption.

Group 2: Which hazard intensity metrics are used for the selected hazards? Discuss and contrast the different hazard outputs that can be compiled for both hazards.

Group 3: We only focus here on the hazard associated with tephra accumulation and lava flow inundation, but what other primary hazards could occur?

Group 4: What secondary hazards could occur in association with the selected primary hazards? How could they evolve with time?

Group 5: What parameters affect the selected hazards? Discuss the objectives and pros and cons of probabilistic versus deterministic approaches.

Good luck!