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A Global Multi-hazard Perspective on Historic Natural Hazards

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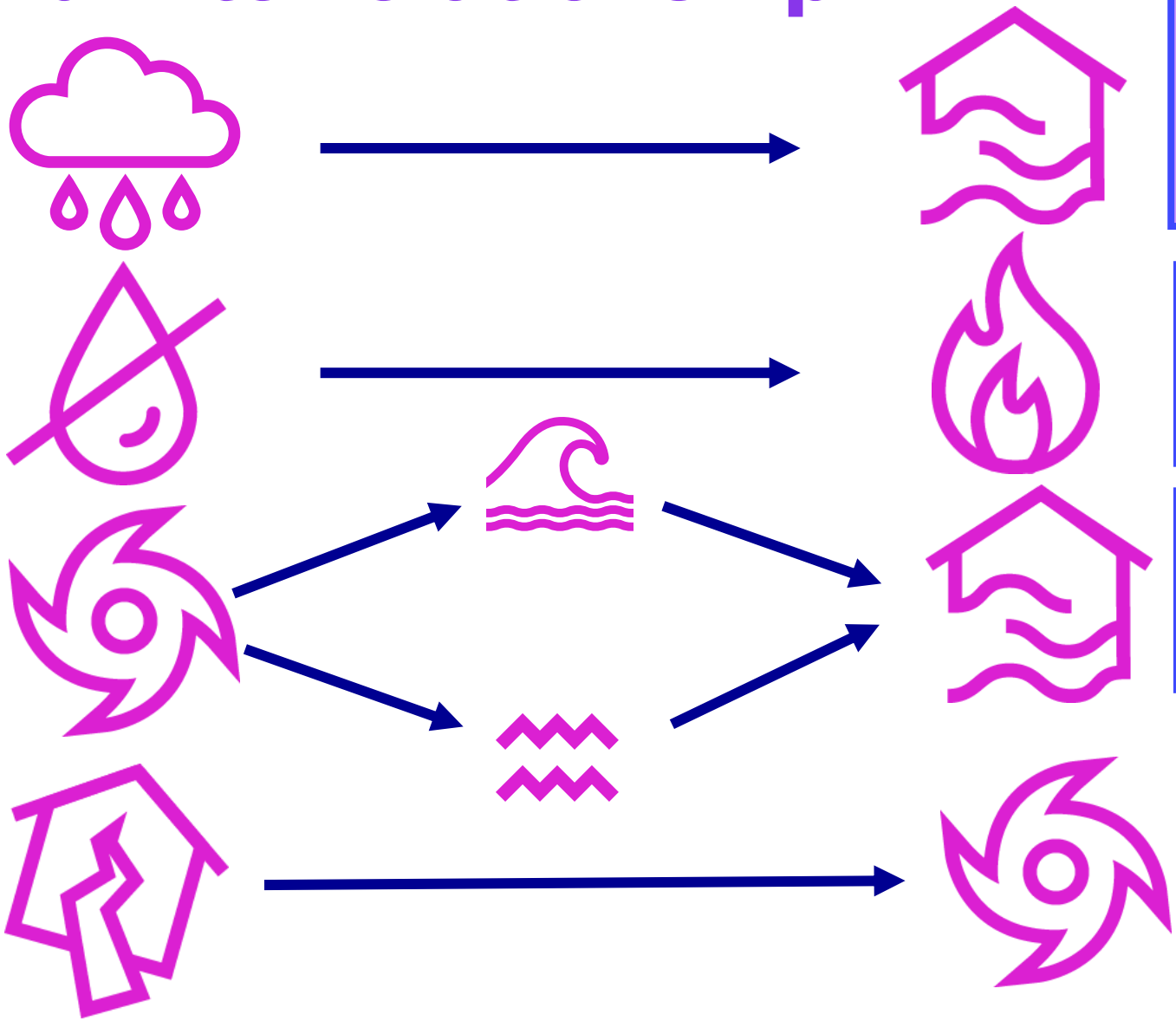
Multi-Hazard Interrelationship

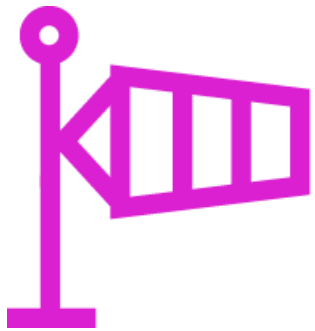


- **Triggering** — One hazard causes another hazard to occur, which can result in hazard chains, networks, or cascades.
- **Amplification** — One hazard can change the likelihood and/or magnitude of additional hazards in the future.
- **Compound** — A combination of multiple drivers and/or hazards that contribute to risk.
- **Consecutive** — Events whose impacts overlap both spatially and temporally, while recovery is still under way.

Research Gap

Triggering | Amplification | Compound | Consecutive

Often multi-hazard types and hazard families are studies separately. We will attempt to combine them into one holistic analysis

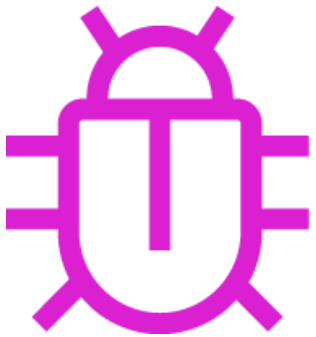


Meteorological

Climatological

Geophysical

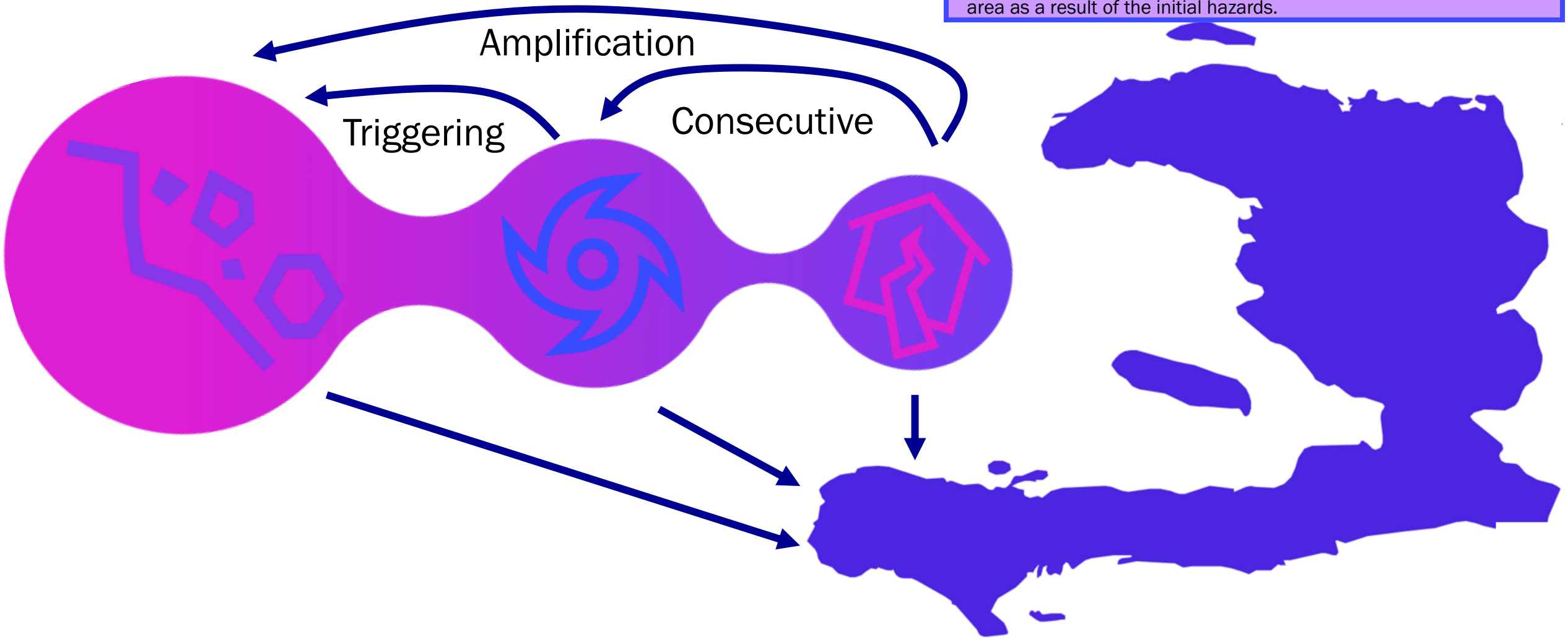
Hydrological



Biological

Why is This Important?

August 2022 Haiti was hit by an earthquake causing damage to housing and roads. Several days later, they experienced a direct hit from a tropical depression. International humanitarian and response teams had to reduce many of their operations. Those who lost homes in the earthquake had to huddled under tarps or tried to find shelter elsewhere. Hundreds of landslides occurred in the impacted area as a result of the initial hazards.



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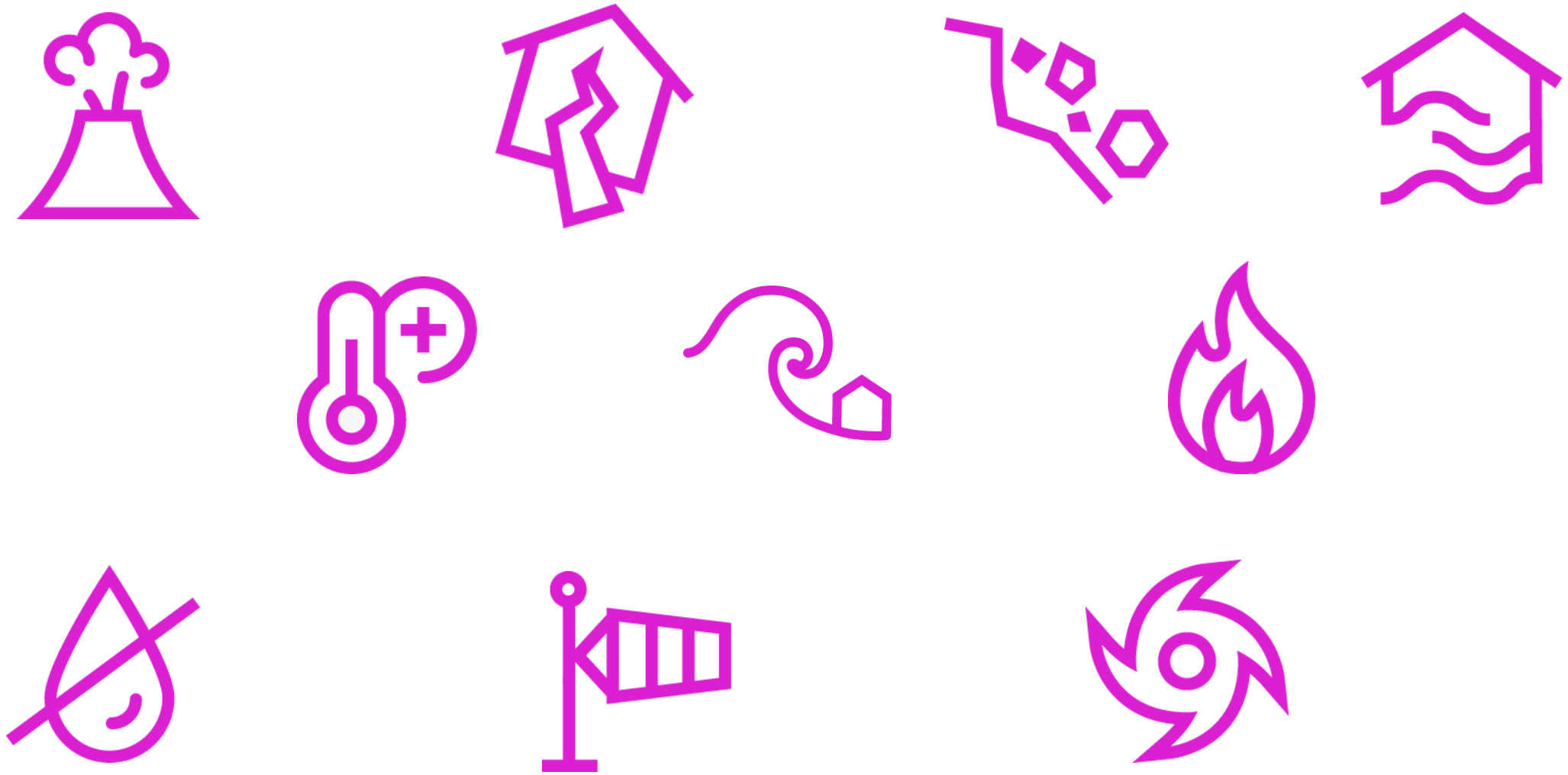
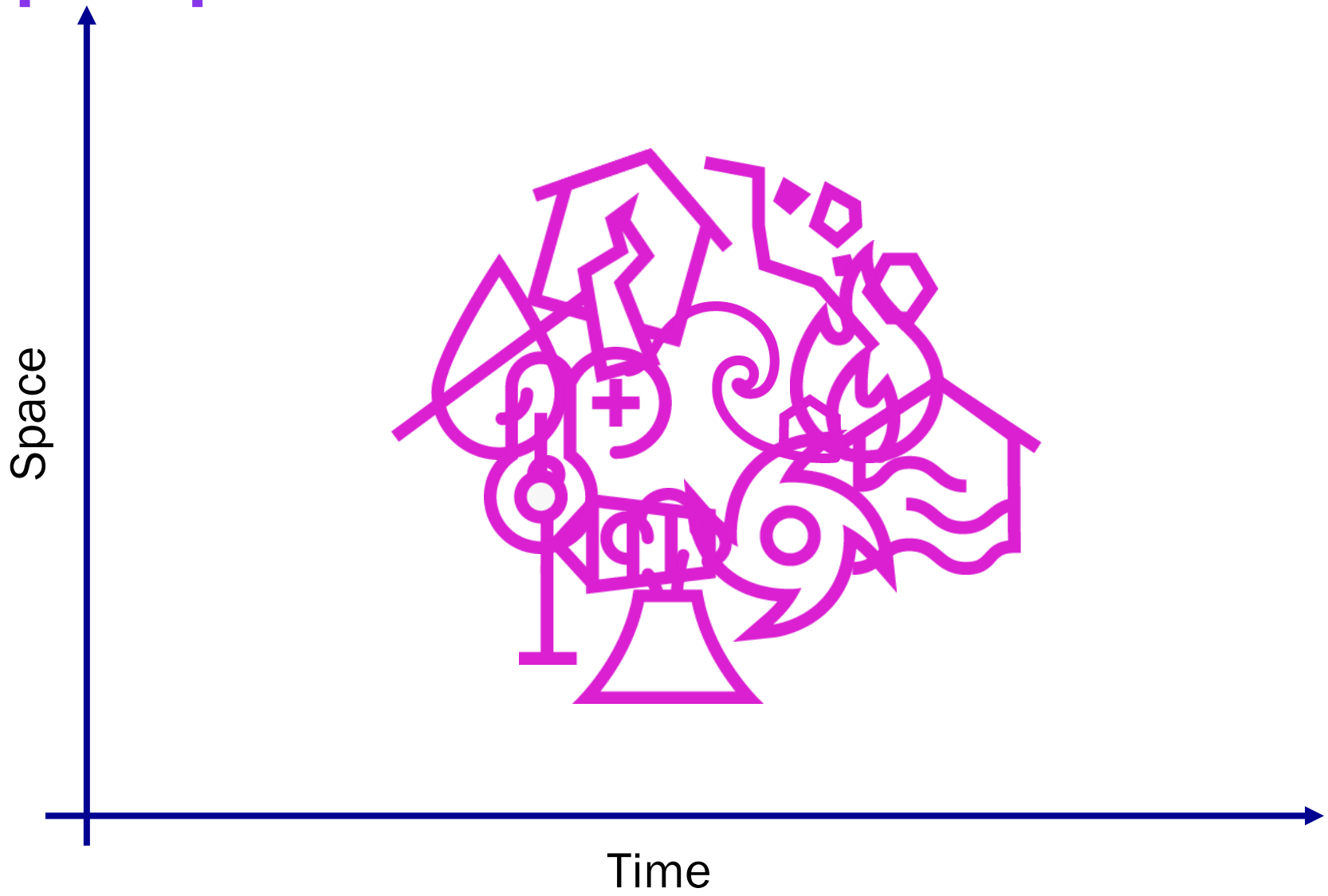
In Order to Prepare we Need a lot of Hazard Data



This Historical Hazard Data can be Used to Find Hazard Overlap in Space and Time



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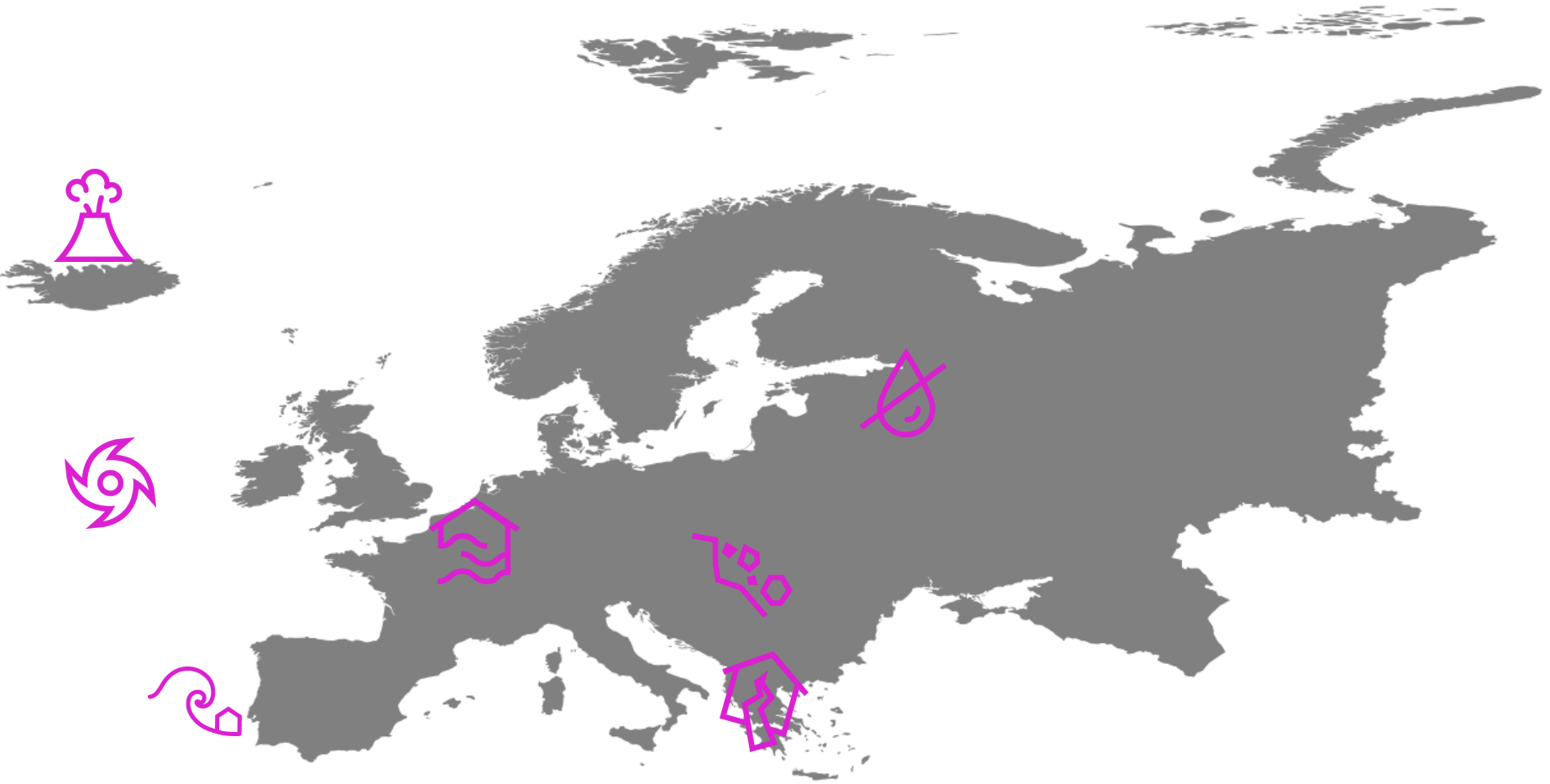
Natural Hazards in Europe



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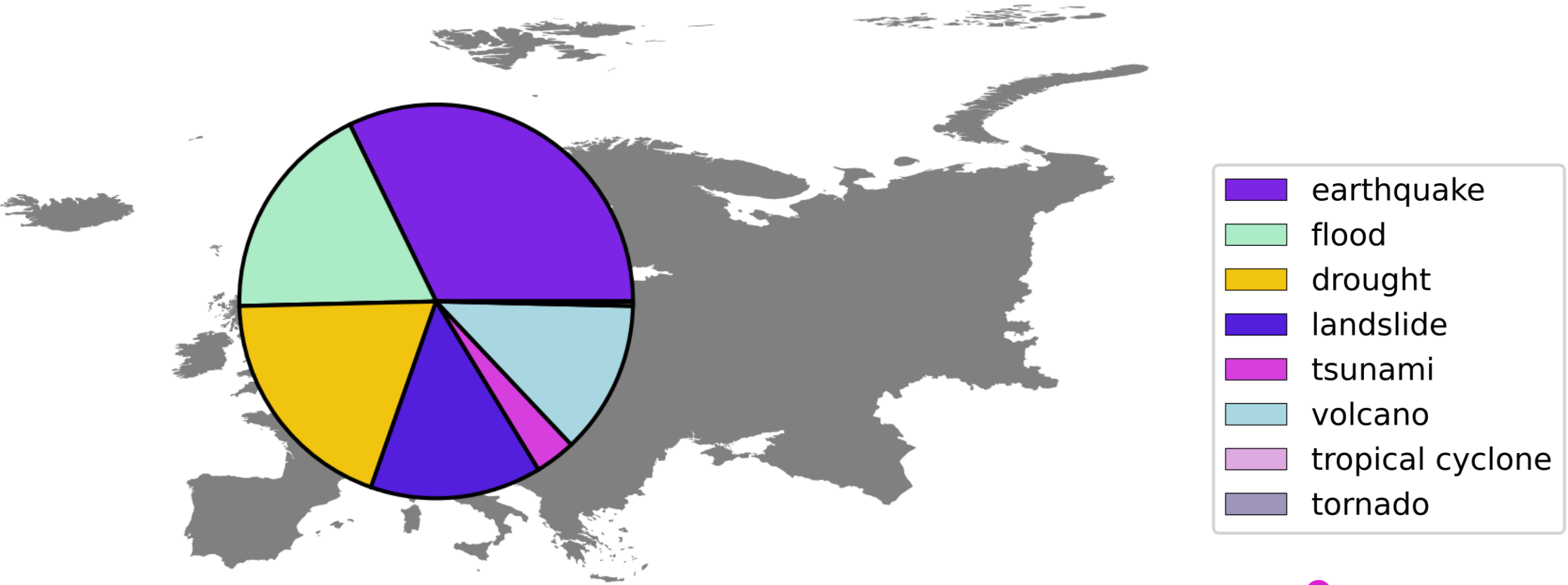
Share of Each Hazard Type Overlapping With Another Hazard In Europe Between 2004-2016



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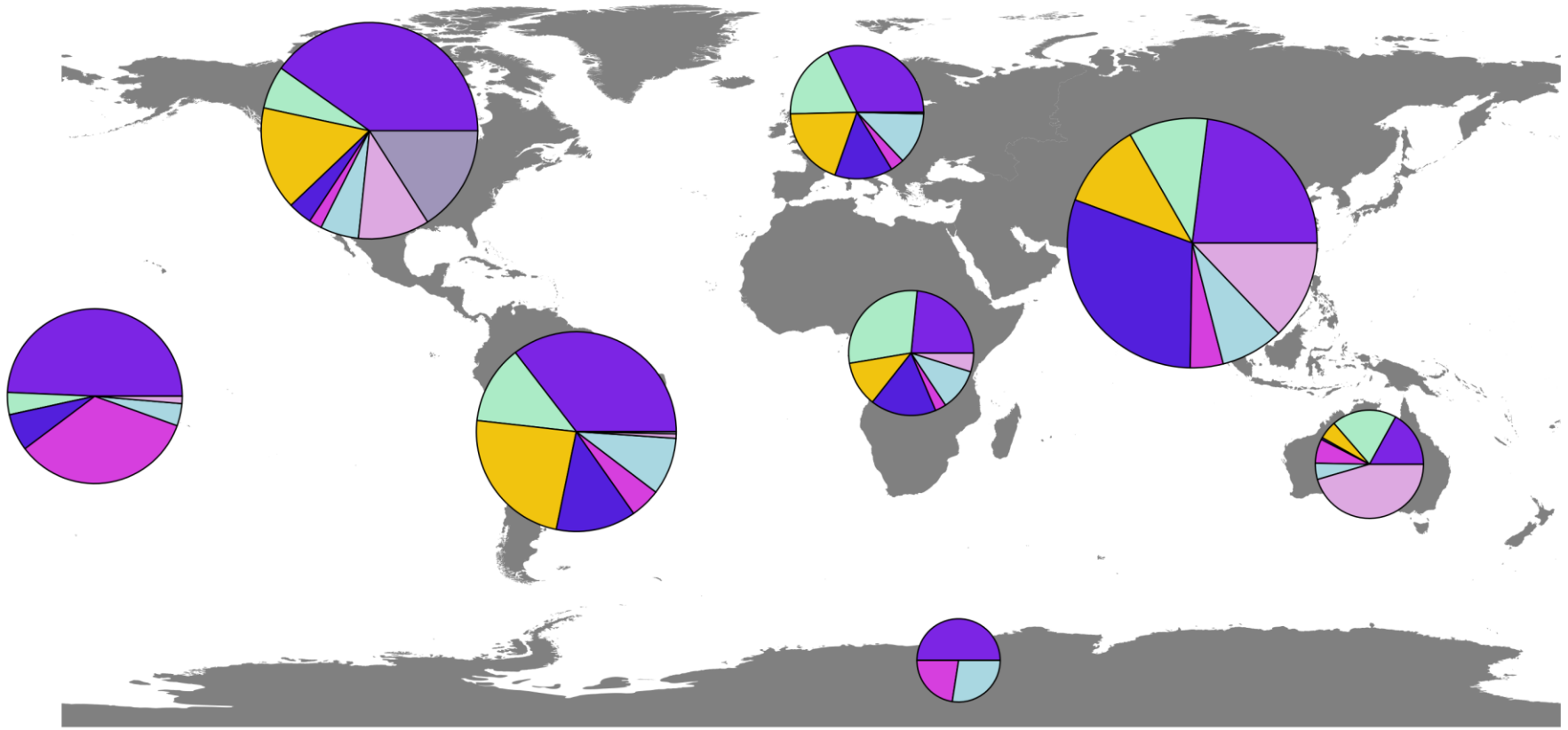
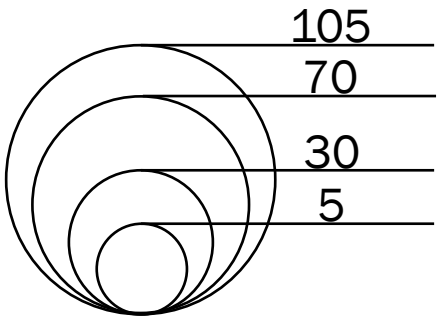
Share of Each Hazard Type Overlapping With Another Hazard per Continent Between 2004-2016



Multi-hazards per 100,000 km^2



- earthquake
- flood
- drought
- landslide
- tsunami
- volcano
- tropical cyclone
- tornado

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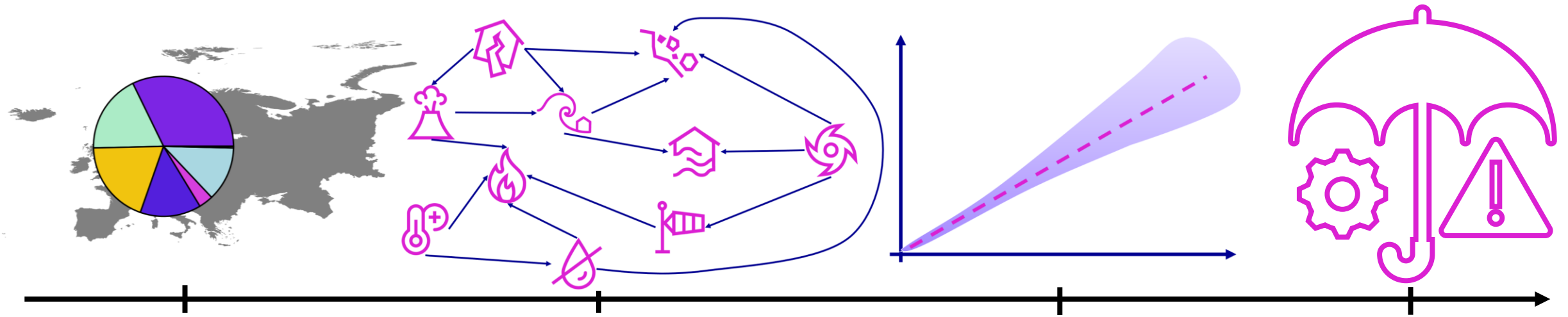
Future Research Outlook



Exploration Diagnosis Predictive Prescriptive

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