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Abstract

Protective forest management faces new challenges under the uncertainty of Climate Change (CC) compound events and their consequences for natural hazard risk in mountain areas. Based on a literature review, this work aims to develop a framework to support risk-based management of protective forests facing CC compound events. The approach will be illustrated with specific examples of CC compound events in protective forests and management interventions that respond to the natural hazard risk. This poster presents the underlying concepts applied in the framework.

Concepts

Protective Forests...

- are forests in mountainous areas that can lower the frequency, magnitude, and intensity of gravitational natural hazards, such as snow avalanches or landslides.
- safeguard human settlements and infrastructure.
- constitute a vital complement to technical protection measures against natural hazards.
- prevent or mitigate natural hazards, depending on factors such as forest structure and management as well as site and hazard characteristics (= protective effect) (Teich et al. 2022).

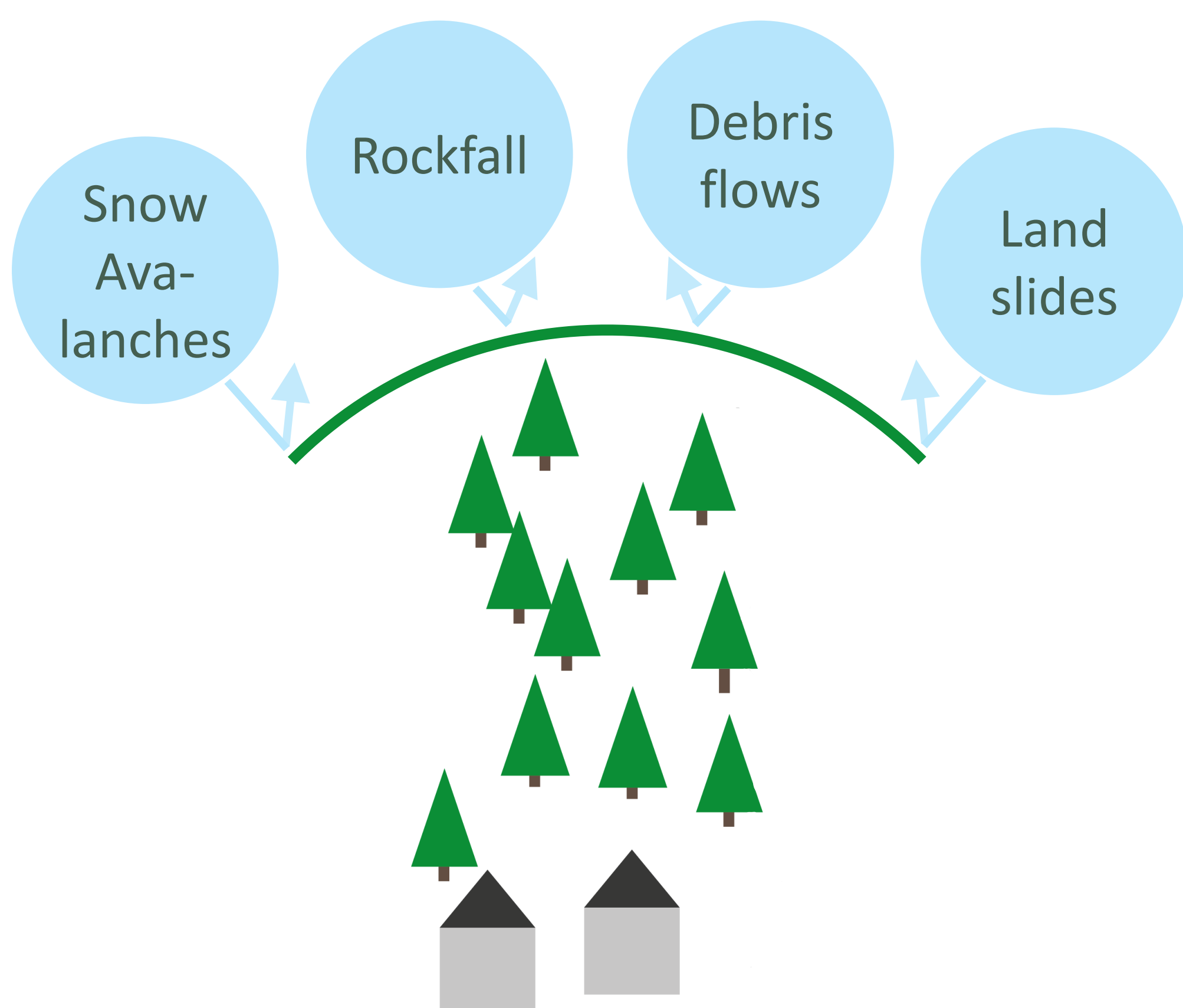


Figure 1: Protective forests safeguard human infrastructure from natural hazards.

Climate Change Compound Events...

- are commonly referred to as a combination of multiple drivers and/or hazards that contribute to societal or environmental risk (Zscheischler et al. 2018).
- can be observed in protective forests with ongoing CC as spatially and/or temporally interacting climate induced events, i.e. stressors, disturbances, natural hazards.
- directly impact a forest's protective effect against natural hazards and can substantially affect the risk for humans and infrastructures.

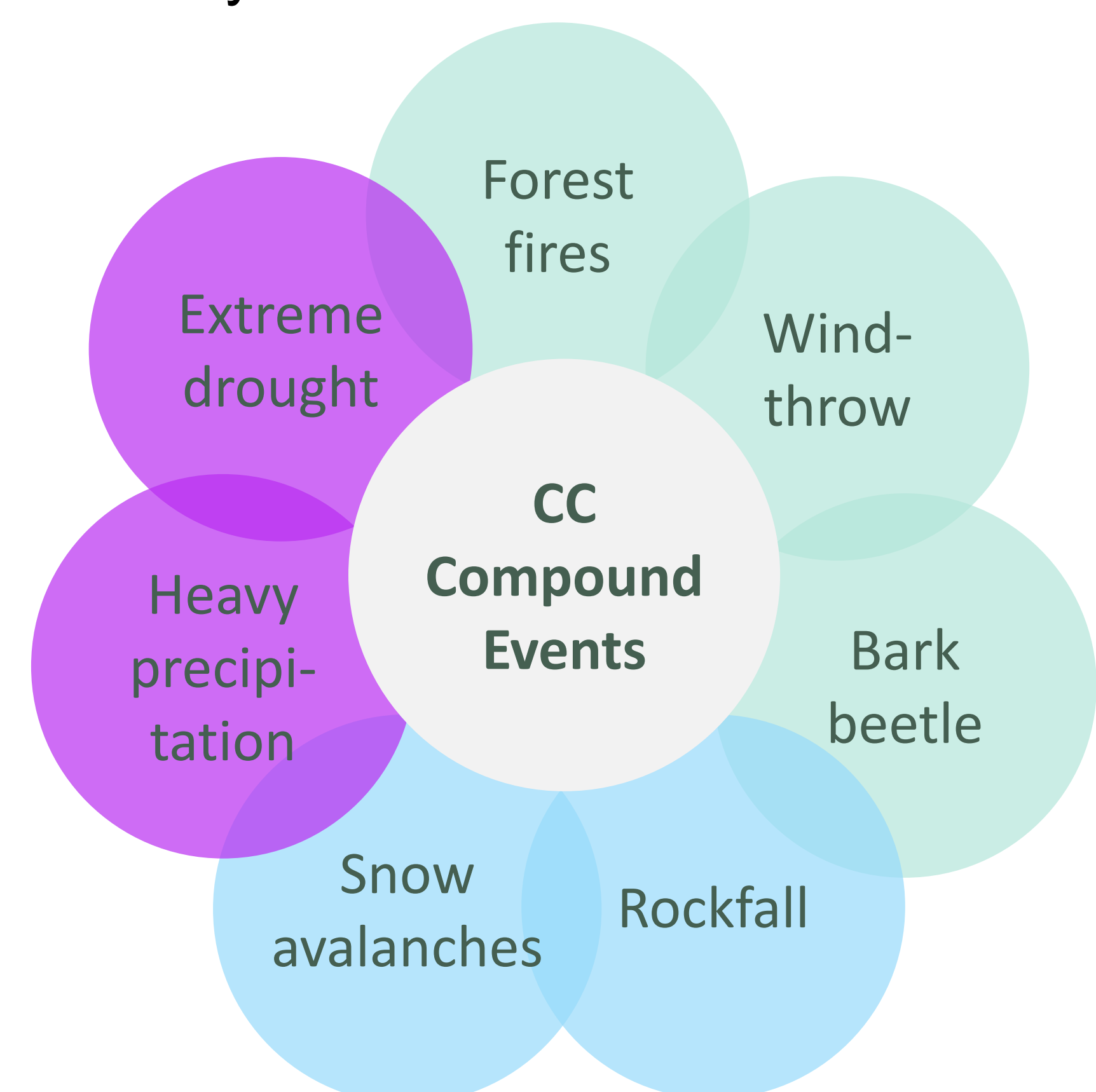
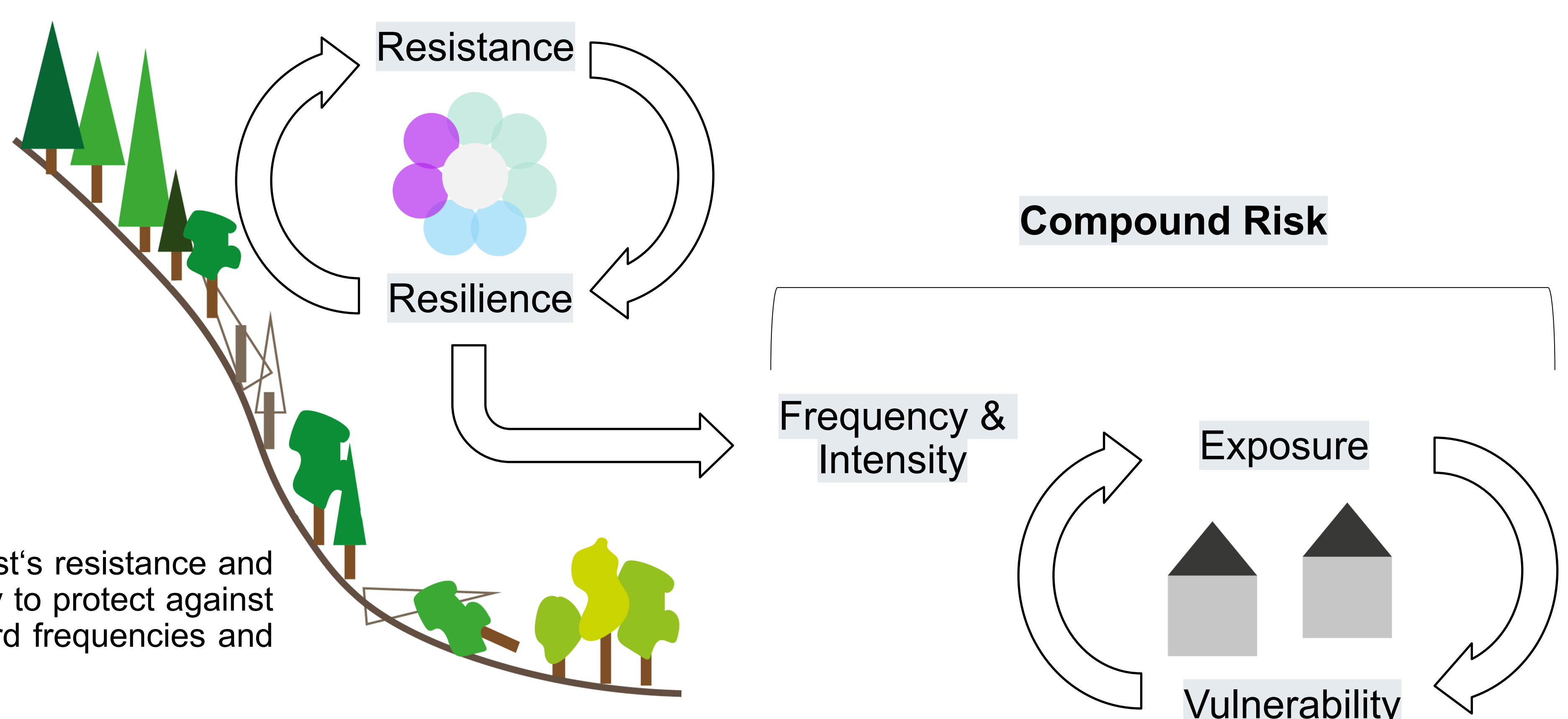


Figure 2: Examples of stressors (extreme drought, precipitation), forest disturbances (windthrow, bark beetle, forest fires) and natural hazards (snow avalanches, rockfall) as compounding events in protective forests exacerbated by CC.

Compound Risk...

- is the natural hazard risk resulting from interacting climate-induced events in protective forests that impact the forests' resistance and resilience to stressors, disturbances and natural hazards.
- changes depending on the number and interaction of CC compound events in protective forest.

Figure 3: CC compound events in forests influence a forest's resistance and resilience to further stressors, disturbances and their ability to protect against natural hazards. Compound risks result from altered hazard frequencies and intensities as a consequence of CC compound events.



References:

Teich et al. (2022): Protective forests as Ecosystem-based solution for Disaster Risk Reduction (Eco-DRR). IntechOpen.
Zscheischler et al. (2018): Future climate risk from compound events. Nat. Clim. Change 8, 469–477.