

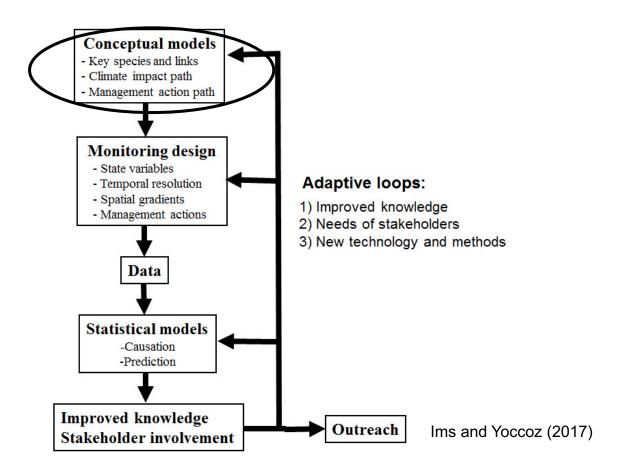
A model of mountain socio-ecological system to catalyse multi-actor collaborations towards sustainability

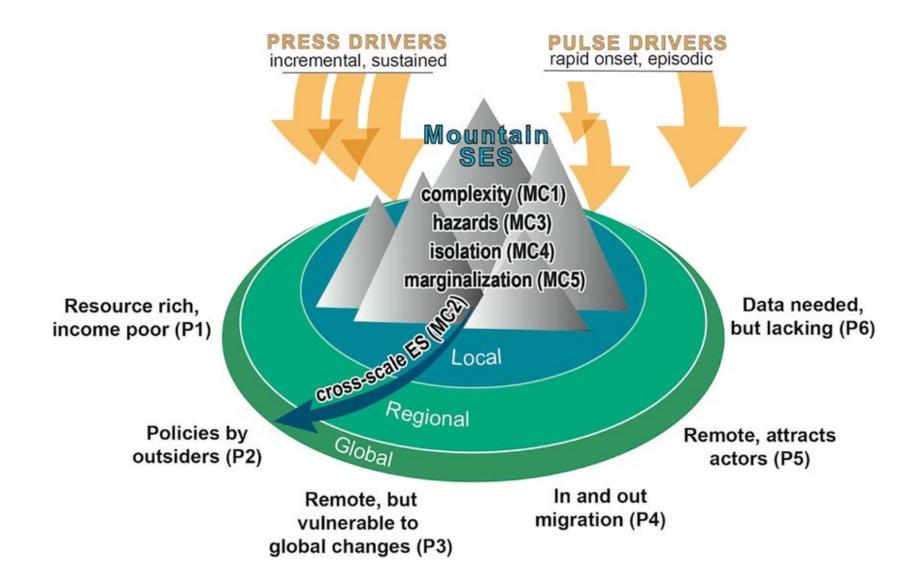
Centre interdisciplinaire de recherche sur la montagne

H. Cristofari, D. Urbach, I. Otero, E. Reynard, A. Guisan, C. Randin

# What are we talking about

A first element to this shift in long-term monitoring consists in the systematic formulation of tractable questions or management objectives, testable hypotheses, and <u>rigorous conceptual</u> <u>models of the study systems</u> (Lindenmayer and Likens, 2009)





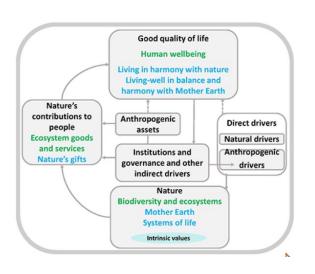
# Objective

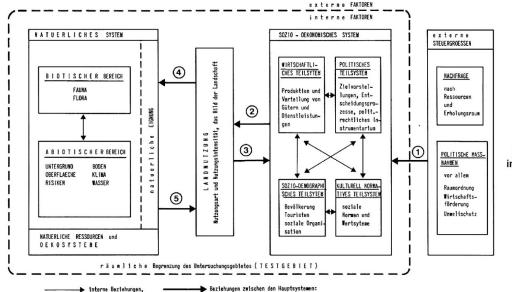
Develop a model of mountain socio-ecological system (MtSES) that:

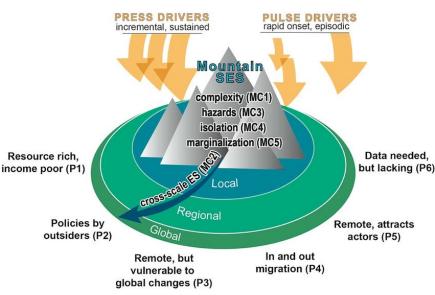
- integrates & unpacks the human and natural components of such systems
- enables the expression of different representations
- serves as a tool to support inter- and transdisciplinary management & monitoring
- builds on existing models

Diaz et al. (2015) IPBES Messerli & Messerli (1978) Man & Biosphere

Klein et al. (2019)







### Methods

Representations of MtSES (commonalities & differences) Model formulation Model testing

Literature review Actors' consultations Scientists' consultations Jura mountains Western Alps Lausanne Lake of Geneva

Central-Western

Alps

Monte Rosa

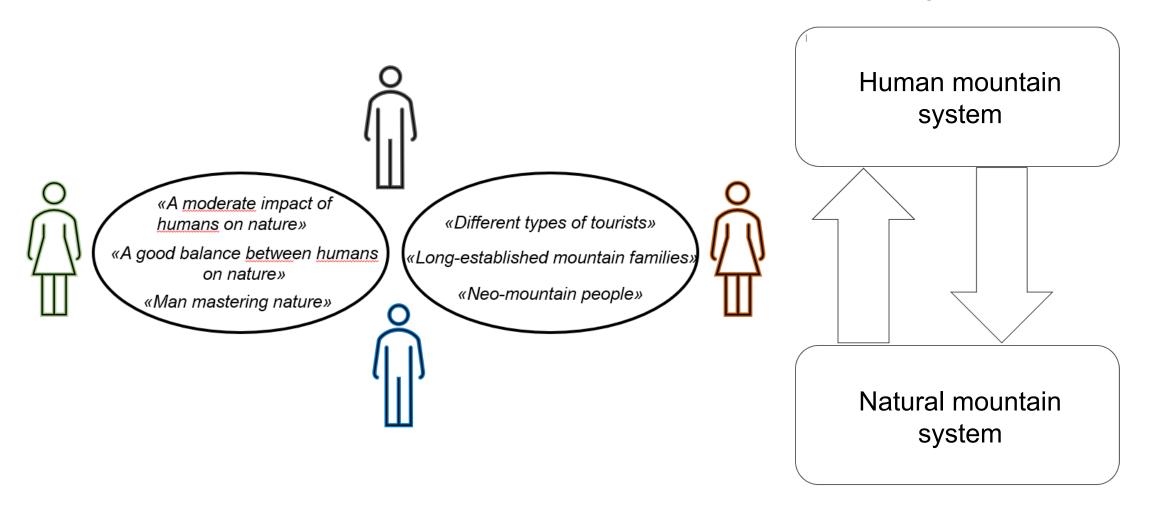


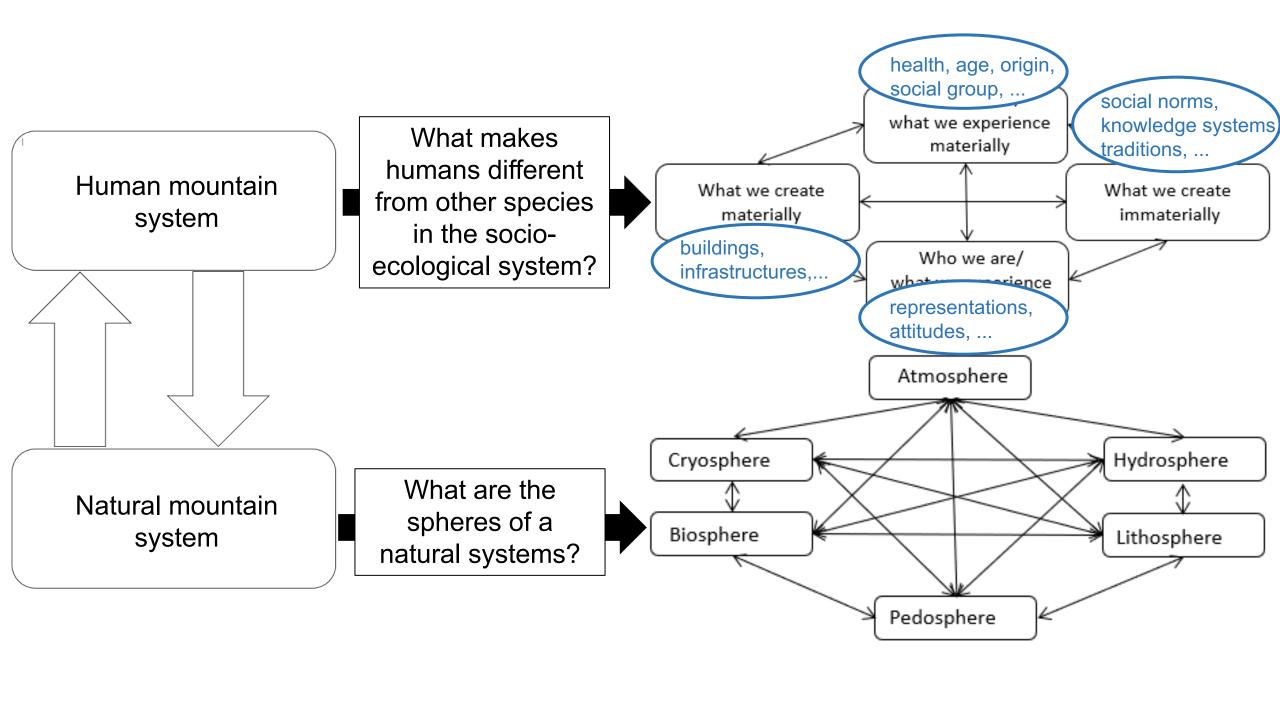




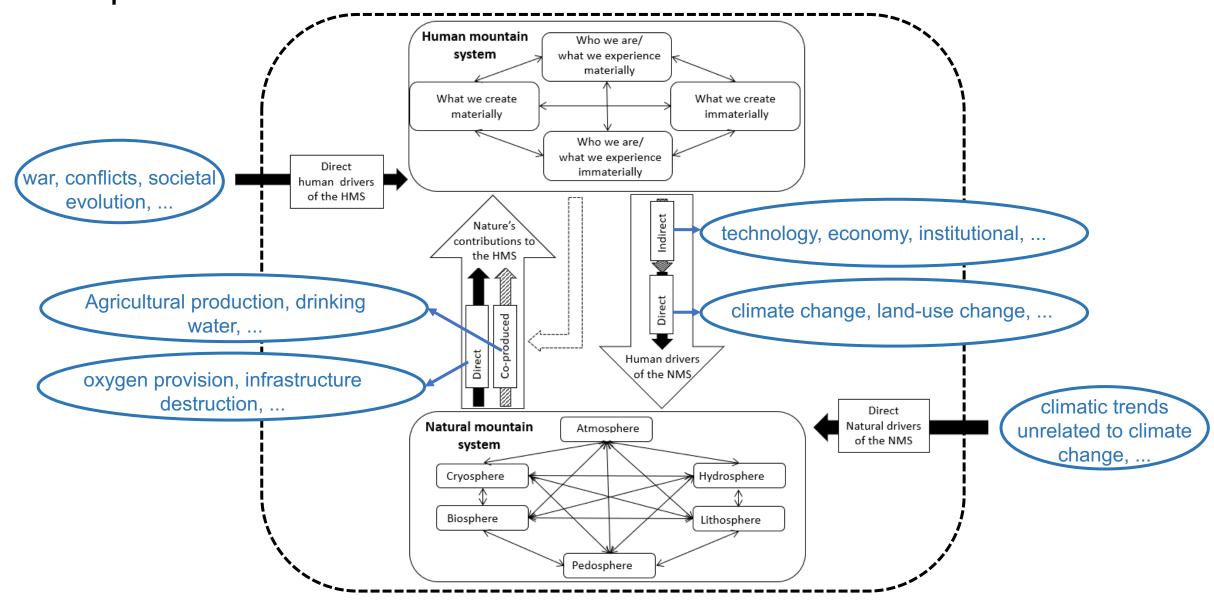
## Model components

Distinction between human and nature & between different social groups





Model processes



# Model stance components

- 1. Responsibility/accountability what am I responsible for? Who do I deem responsible for what?
- 2. Legitimacy Do I have legitimacy to act in this way, to be present in this area, to participate in this discussion? Who do I deem legitimate?
- 3. Acceptation What do I accept as it is, what do I want to control? What do I deem acceptable for others as well?
- 4. Awe/affiliation To what extend do I feel affiliated and in awe of the mountain system? Whom do I expect to be in awe as well?
- 5. Perceived self-efficacy To what extend do I feel able to act in a way that may have a significant impact? Who do I deem able to act in an efficient way?

#### Tourism and mountain trail management

Age, origin, health:

Age, place of origin, perceived health

Large infrastructure: transportation capacity, lodging capacity

Direct human drivers of the HMS

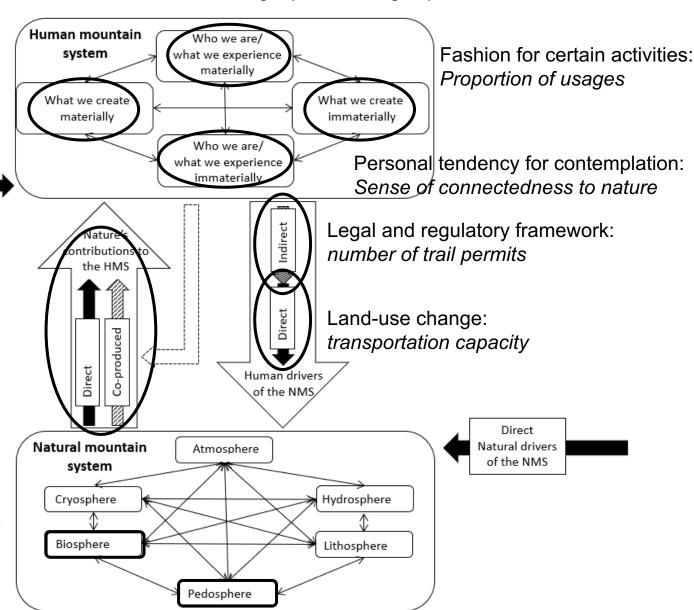
Regulation of air quality: air quality index

Learning and inspiration: number of pictures of the areas taken by visitors

Physical and psychological experience: hormonal levels after activity

Species composition, distribution, richness; species behaviour, reproductive rate and success

Soil erosion, soil abiotic factors



### Pastures vulnerability and adaptation strategies to climate change impacts in the Alps

