What TeamX can do for mountain ecology

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A primer on land-atmosphere feedbacks

• Negative feedback from land and ocean sink is reducing greenhouse effect and slowing down global warming.
In order to accurately reproduce land-atmosphere feedbacks models need to (i) represent the underlying processes and (ii) be informed by appropriate data, BUT ...
In order to accurately reproduce land-atmosphere feedbacks, models need to (i) represent the underlying processes ...

Lehner & Rotach (2018)
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In order to accurately reproduce land-atmosphere feedbacks, models need to (i) represent the underlying processes and (ii) be informed by appropriate data.

- Compared to their aerial extent, flux measurements in mountainous topography are underrepresented.

Rotach et al. (2013)
At the same time, many mountain regions are experiencing rapid changes in climate ...
At the same time, many mountain regions are experiencing rapid changes in climate ...

- Earlier snow melt causes increase in carbon uptake.

Scholz et al. (2018)
At the same time, many mountain regions are experiencing rapid changes in climate ...

Jolly et al. (2005)
At the same time, many mountain regions are experiencing rapid changes in climate ...

- Earlier snow melt causes a lengthening of the time required by grassland to become carbon sink.
- This effect is more pronounced at lower elevations, where snow melt occurs earlier in the season with shorter days.

Wohlfahrt et al. (2013)
At the same time, many mountain regions are experiencing rapid changes in climate and land use.

1905

2010

Pictures courtesy Erich Tasser
At the same time, many mountain regions are experiencing rapid changes in climate and land use.
At the same time, many mountain regions are experiencing rapid changes in climate and land use

\[ \text{PPT - ET} \approx \text{Runoff} \]
What TeamX can do for mountain ecology

- Mountain ecosystems are undergoing rapid changes in climate, often in combination with land use.
- Changes in ecosystem structure and function result in both positive and negative feedbacks to climate.
- Effects not confined to mountain areas (e.g. water towers).

TeamX can help to better understand the underlying processes by

- advancing the theory that underlies the measurement and modelling of the land-atmosphere exchange in complex mountainous topography,
- improving data availability and
- pointing the spotlight to mountain areas.
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