Altitudinal soil and vegetation transition in alpine desert, the Central Great Caucasus, Georgia

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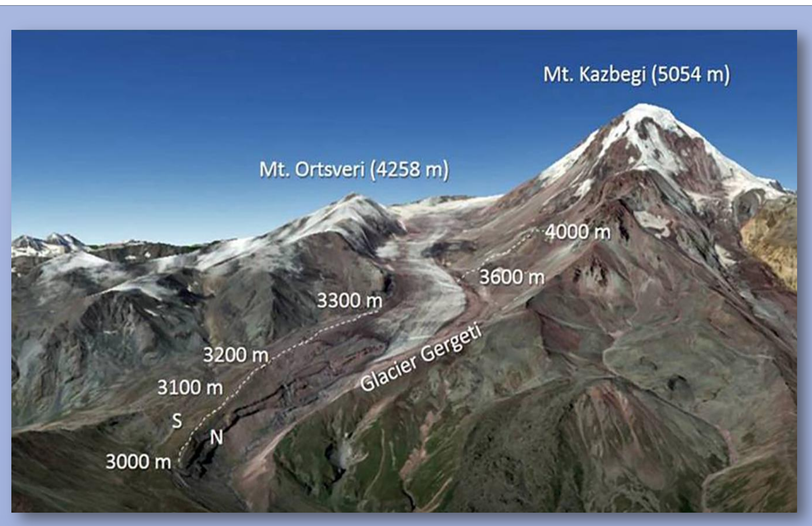
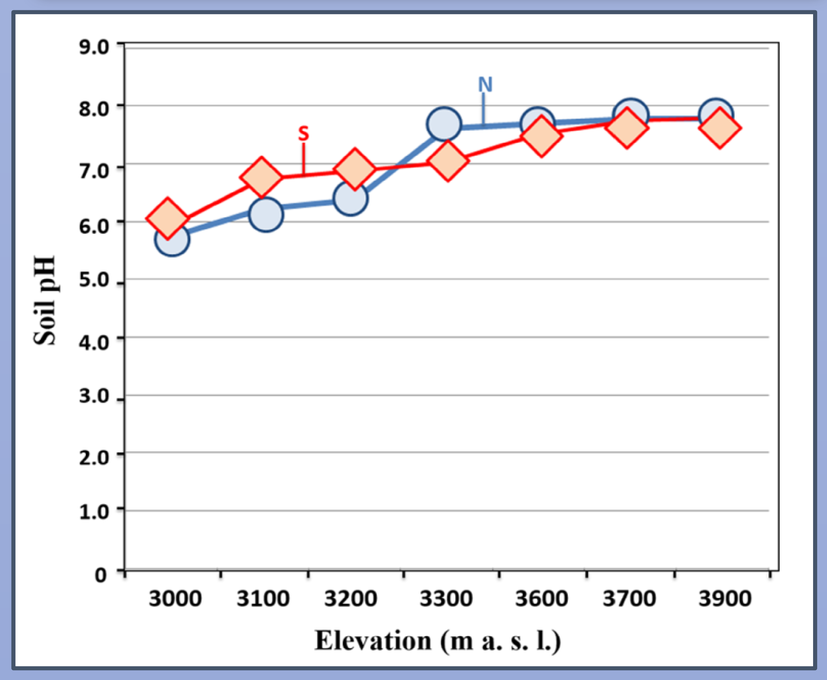
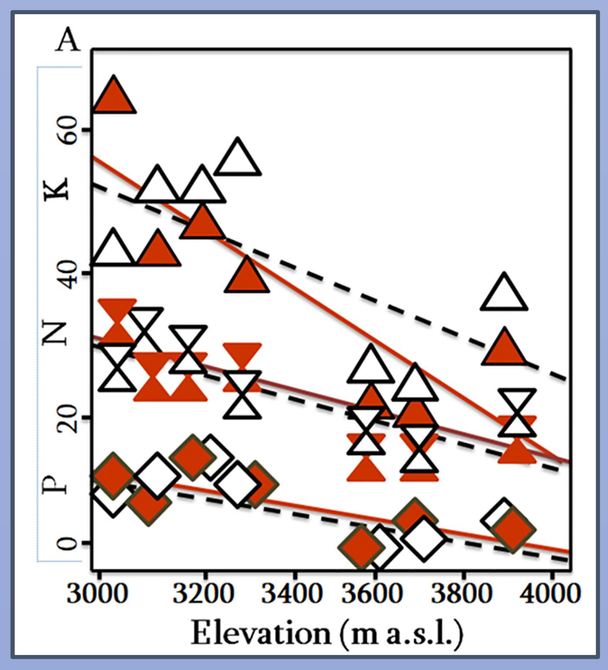


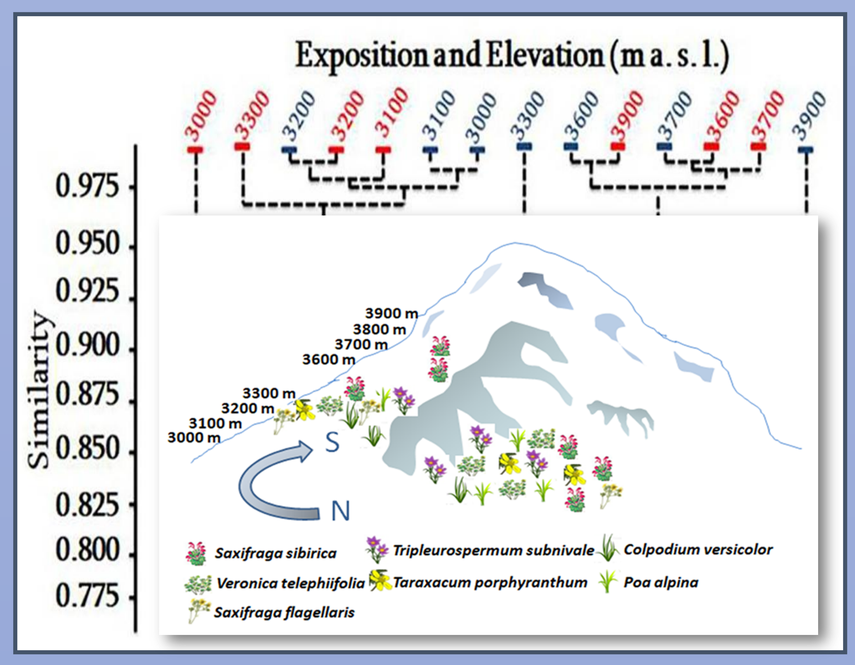
Alpine deserts are noteworthy habitats in high mountain systems such as the Caucasus. However, very little is known on the soil properties in these habitats. Another unexplored question is the transition between subnival (lower part of alpine desert) and nival (upper part of alpine desert) belts. We studied soils and vegetation in an alpine desert along its practically entire elevation range (3000-4000 m a.s.l.) on two contrasting slope aspects (north vs south) of Mt. Kazbegi, the Central Great Caucasus, Georgia.



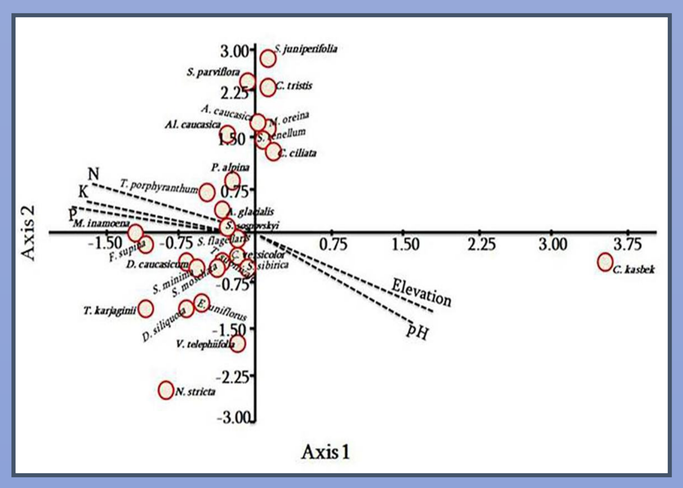
Soil pH along elevation gradient in alpine desert of Mt. Kazbegi; circles show North and diamonds show South



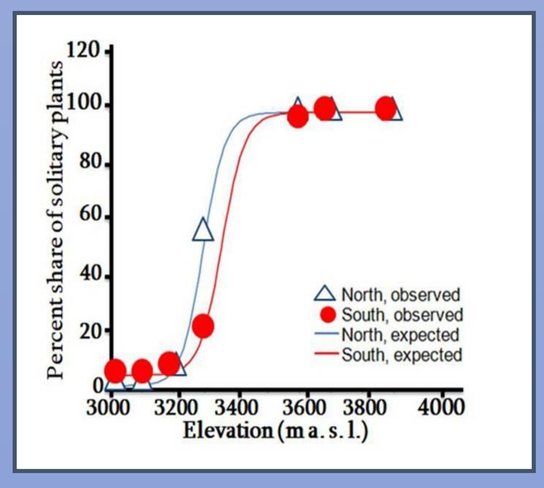
Plant available N (left upper panel), P (right upper panel), K (left lower panel) along an elevation gradient (3000 to 3900 m a.s.l.).



Cluster analysis of sampling sites by plant available NPK, soil pH and elevation (3000 to 3900 a.s.l.); Cophen Correlation = 0.79.



Species distribution along an elevation gradient (3000-3900 m a.s.l.). Plant available N, P, K, soil pH and elevation are tightly collinear with CCA Axis 1 ($p < 0.001$)



Percent share of solitary plants in subnival-nival patches along altitudinal gradient (3000-3900 m a.s.l.). Hill's sigmoidal model describes the change accurately (Akaike's information < 31 on both slopes).

√Our results show two characteristics of alpine desert vegetation and soils, which have not been documented to date: (1) an unexpected change of slope preference of many relatively abundance plants which probably is associated with different soil pH profiles on N and S slopes, and (2) a vegetation switch between subnival and nival belts that occurs at relatively lower elevations than expected from the concept of alpine-nival ecotone.

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