



Climate Change Driven Implications on Spatial Distribution of High Andean Peatlands in the Central Andes

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High Andean peatlands are among the most unique habitats in the tropical Andes and certainly among the least studied. High Andean peatlands occur patchily in montane grassland and scrub below snow line and above tree line. These high-elevation peatlands are sustained by glacial runoff and seasonal precipitation. We used remote sensing data to estimate that peatland habitat is approximately 2.5 % of our study region in the Puna, an ecoregion located in the high Andes above 4000 m a.s.l. Individual sizes of our estimated peatland polygons ranged from 0.72 ha to 1079 ha with a mean size of 4.9 ha. Climate change driven implications on spatial distribution of high Andean peatlands were assessed in two ways. First, we estimated the effect of predicted regional temperature increase by using the standard lapse rate of 2° C per 300 m for assessing peatland habitat patches that would remain above a critical thermocline. Nearly 80% of peatland habitat patches were predicted to occur below the thermocline if the prediction of 4° C temperature increase is realized. The second assessment relied on the quantified assumption that permanent snow or glacier cover, topographic characteristics (e.g. slope) and precipitation of a basin are essential variables in the occurrence of high Andean peatlands. All 17 basins were predicted to have a decrease in peatland habitat due to snow line uplift, decrease in precipitation and consequent insufficient wetland inflows. Total habitat loss was predicted for two basins in the semi-arid part of the study area with a snow line uplift to 5600 m and a projected decrease in precipitation of 1 mm per year over the next 40 years. A combined result of both assessments provides important information on climate change driven implications on the hydrology of high Andean peatlands and potential consequences for their spatial distribution within the Central Andes.