EGU2020-19107
https://doi.org/10.5194/egusphere-egu2020-19107
EGU General Assembly 2020

How the recently discovered grit crust shapes the Atacama Desert – Combining environmental studies on cryptogams and remote sensing

Patrick Jung[1], Lukas Lehnert[2], Michael Lakatos[1], Michael Schermer[3], Karen Baumann[4], Luise Wraase[5], Kai-Uwe Eckhardt[4], Maaike Bader[5], Peter Leinweber[4], Jörg Bendix[6], and Burkhard Büdel[3]

[1]University of Applied Sciences Kaiserslautern, Applied Logistics and Polymer Sciences, Pirmasens, Germany (patrick_jung90@web.de; michael.lakatos@hs-kl.de)

[2]Department of Geography, Ludwig□Maximilians□University, Munich, Germany (lehnert.lu@lmu.de)

[3]Plant Ecology and Systematics, University of Kaiserslautern, Kaiserslautern, Germany (mscherme@rhrk.uni-kl.de; buedel@bio.uni-kl.de)

[4]Faculty of Agricultural and Environmental Science, Soil Science, University of Rostock, Rostock, Germany (karen.baumann@uni-rostock.de; kai-uwe.eckhardt@uni-rostock.de; peter.leinweber@uni-rostock.de)

[5]Faculty of Geography, Ecological Plant Geography, Philipps□University of Marburg, Marburg, Germany (luise.wraase@geo.uni-marburg.de; maaike.bader@geo.uni-marburg.de)

[6]Faculty of Geography, Laboratory for Climatology and Remote Sensing, Philipps□University of Marburg, Marburg, Germany (bendix@mailer.uni-marburg.de)

The Atacama Desert is the driest non-polar desert on Earth, presenting precarious conditions for biological activity. In the arid coastal belt, life is restricted to areas with fog events that cause almost daily wet-dry cycles. In such an area, we discovered a hitherto unknown and unique ground covering biocoenosis dominated by lichens, fungi and algae attached to grit-sized quartz- and granitoid stones (grit crust). In contrast to previously known CGC from arid environments to which frequent cyclic wetting events are lethal, here every fog event is answered by photosynthetic activity of the soil community and thus considered as the desert's breath. Photosynthesis of the new CGC-type is activated by the lowest amount of water known for such a community worldwide thus enabling the unique biocoenosis to fulfill a variety of ecosystem services such as protection against soil erosion and contributions to accumulation of soil carbon and nitrogen and soil formation through bio-weathering. Using state-of-the-art remote sensing technology, we estimate the total cover of the grit crust and show that the newly discovered organisms cover large areas along the coastal belt of the Atacama Desert.