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## Distribution of biological soil crusts in the Tibetan Plateau

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Biological soil crust (biocrust) is regarded as a self-organizing principle, and widely distributes in the Tibetan Plateau, which is a crucial ecological security area of China and water tower of Asia. Unfolding biocrust distribution in the region is critical to maintain ecosystem functions and services therein. However, we know little about explicit distribution of biocrust in the Tibetan Plateau. To that end, this study combined field survey, reference compiling and random forest algorithm to explore the spatial distribution of biocrusts on Tibetan Plateau and the associated driving factors. A total of 203 data points had been collected. We found that the biocrusts cover up to 20% of the soil surface in the Tibetan Plateau and mainly cover the Qaidam Basin and the northern Tibetan Plateau, but less in the Qiangtang Plateau and the southeastern Tibetan Plateau. The dominating factors affecting biocrust distribution are soil clay content, altitude, average temperature of the hottest season, pH, and soil organic carbon content. Specifically, biocrust acclimatization is positively affected by lower soil clay content and elevation, hotter quarter temperatures (especially greater than 8°C), and greater pH, while negatively affected by higher soil organic carbon content. Overall, this study sheds light on biocrust distribution in the Tibetan Plateau, and will significantly expand our understandings of biocrusts.