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Water Absorption Capcapability and Moisture Content Seasonal Changing of Salt-Crust in Lop NurDry Lake

KONG Deyong¹, LI Baoguo¹, MA Lichun², JIANG Ping'an³, WU Hongqi³ and LIU Hongpeng³

¹ College of Resources and Environment, China Agricultural University, Beijing 100193, China

² Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing 100037, China

³ College of Grassland and Environment Science, Xinjiang Agricultural University, Urumqi830052, China

The Lop Nur dry salt lake, Xinjiang province, is characterized by typical physiognomy salt-crust, located in 39.6-41.3N. latitude and 89.6-91.4E. longitude. The thickness of salt-crust is about from 20 cm to 100 cm, and the surfaces consist of pressure-ridges with well-developed hexagonal honeycomb-shaped structures. The average annual precipitation and evaporation is 38.5 mm/a and 3776.5 mm/a respectively in the Lop Nur basin, that presents a continental arid climate.

The Lop Nur dry salt pan shapes like clearly an ear of human being on a gigantic scale in satellite images. Based on the interpretation experience of salt soil in the satellite images, we know that the moisture content in an area of satellite images is higher, the hyperspectral reflection is lower, and its color in this satellite images area is more dark. In this study, atypical grey and dark stripe were selected respectively within the dry salt lake to observe the moisture content changing on the surface of salt-crust, groundwater level and meteorological data from May 2009 to August 2010. The observing site in white strips is named by WOS and another one in black strips is called BOS (Fig 1) in this paper. At the same time, a simulating experiment, using a near-constant temperature and humidity testing units, was implemented to find out the water absorption characteristic of salt-crust under various temperatures and the same relative humidity of 60%.

Drying method was used to detect gravimetric moisture content of salt-crust in this paper. Free water content and hygroscopic moisture content can be lost after 8 hours drying of the constant temperature of 105°C, and the water content of crystallization need 200°C drying. It could be concluded that:

(1) The moisture content of salt-crust in the two observing sites are different. Fig 3 shows that the free water

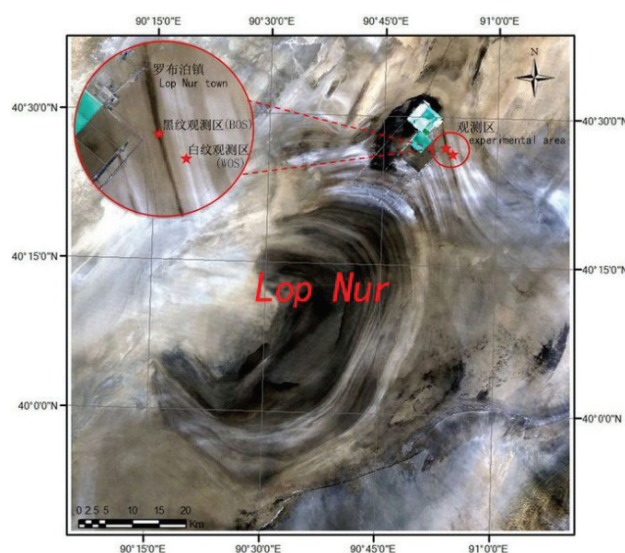


Fig. 1. The location of two observing sites in the Lop Nur image



Fig. 2. The surface on the two observing sites

content and hygroscopic moisture content in WOS are higher than that in BOS from Summer to Autumn, but which indicate a contrary tendency in Winter and Spring. The water of crystallization content in WOS is clearly less than that in BOS any time of year.

(2) Based on field observation, the groundwater level is relatively stable, with a little changing range of 5.0m-5.2m, makes little contribution to the moisture content of salt-crust

* Corresponding author. E-mail: drkdy@sina.com

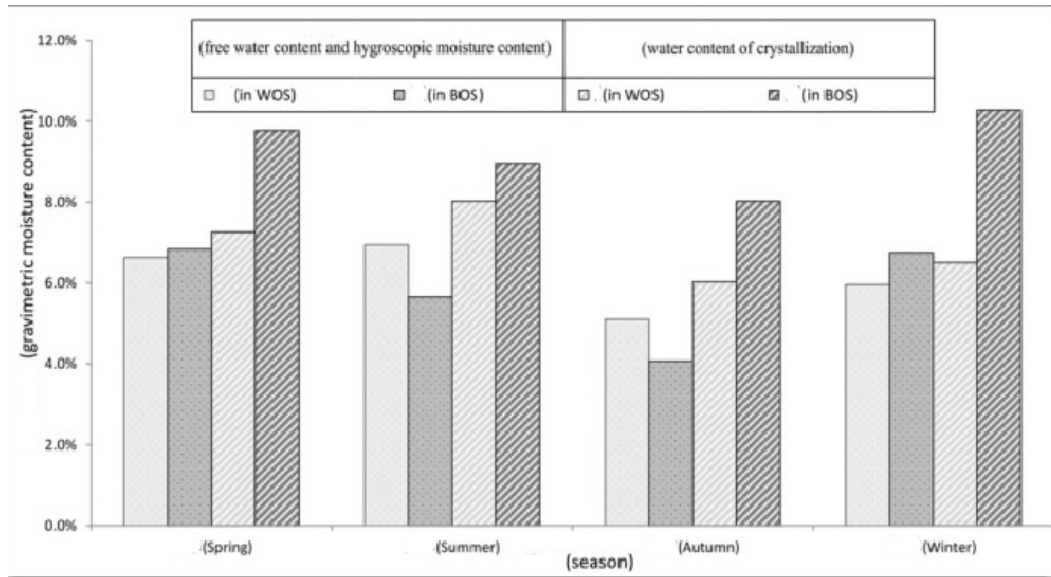


Fig3 The moisture content changing of the salt-crust during the 4 seasons

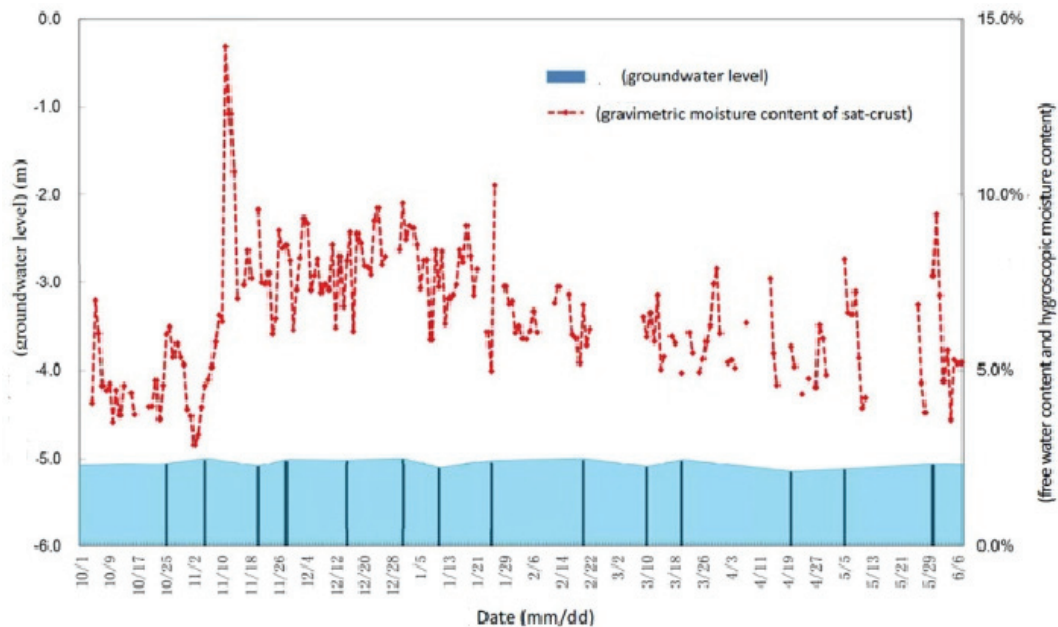


Fig 4 Therelation between moisture content change and the groundwater level changein BOS

in BOS.

(3) The absorption water experiment was simulated under the same relative humidity of 60% and various temperatures of 20°C, 30°C and 40°C, and the results show that the salt-crust in BOS express a stronger water absorption capability. The water absorption capability of salt-crust in BOS appears an increasing tendency with the temperature rising within 12h, the moisture content are increased by 5.6%, 6.6% and 11.6% under simulating temperature 20°C、30°C and 40°C respectively, while the moisture content rise to peak value under the simulating temperature 40°C, then begin to lose water and decrease to 7% after 22h. The moisture content of salt-crust in BOS are slowly increased all the time under simulating temperature

20°C and 30°C, after 22h the moisture content increase to about 7%, too. On the contrary, the salt-crust in WOS does show a weakly water absorption capability in the experiment process, the moisture content are only increased by 0.5% all the testing time. The absorption capability of salt-crust in BOS is remarkably stronger than that in WOS under any simulated temperature.

Key words: Lop Nur; Dry Lake; Salt-Crust; Moisture Content; Water Absorption Capcapability

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