



Vadose water content within the surface layer of a megadune

J. Hatch (1), C. Ainslie, C. Columbo (2), H. Walker (3), W. Gu (4)

(1) Detica, Guildford, UK, (2) Ontario Ministry of Natural Resources, Ontario, Canada, (3) Teradyne, Boston, USA, (4) Nanjing Institute of Hydrology and Water Resources, China

In the southeast of the Badain Jaran Dune Desert, Inner Mongolia, which covers an area of about 44,300 km², lies an area of megadunes with a relative height of 300-400m (and altitude of 1300-1488m a.s.l.). Within these megadunes there are about 140 saline lakes surrounded with fresh springs. The annual mean precipitation is only about 70 mm. It is still a mystery as to the recharge sources of the groundwater system of the area and the origin of the water in these megadunes - water that maintains the vegetation and the megadune itself.

As a first step in exploring this, two experiments were conducted during a camel expedition in October 2006. First, measurements were made of the diurnal variation of vadose water content of the megadune surface and compared with air humidity readings. Surface water content varied from 1.0% to 1.7%, peaking between 11am and 2pm - a surprisingly long delay compared with peak air humidity between 5am and 8am. Secondly, depth profiles of vadose water content were measured at six different heights on one particular megadune. All these profiles have a vadose water content of about 1% to 1.5% volumetrically at the surface and about 1% to 3% at the depth of 1 m. For the two lower sites (6m and 10m above lake surface), water content increased substantially below about 50cm, but no such increase was seen for the higher sites (40m to 127m above lake surface). It reveals a condensation mechanism from local source.