Many climate change impact studies routinely use reanalysis outputs, which employ models to turn meteorological observations into consistent global databases. Reanalysis outputs are convenient: the output is on a grid, has no missing records and can be easily downloaded over the internet. But Vautard *et al.* reinforce that, contrary to observations[1–3,5,6], reanalysis outputs do not capture trends in near-surface wind speeds[5,10]. Clearly these datasets are not yet suitable for examining long-term trends in near-surface winds and related processes such as evapotranspiration.

Vautard *et al.*[2] corroborate that, across the Northern Hemisphere, surface winds have slowed down, and propose that an increase in surface roughness has contributed to the trend. At least two implications are immediately obvious. Stilling seems to be greater at higher elevations[6] that yield much of the fresh water for human consumption. Slower winds in these regions could partially offset any rise in evaporation owing to factors such as rising air temperatures[1,3,11]. Second, wind power depends on the cube of wind speed, and Vautard *et al.* show that stilling results primarily from a reduction in high wind speeds, especially in Asia. Hence, the potential for power generation from wind turbines has fallen in this part of the world over the past few decades. However, the observations were made ten metres above ground. To unequivocally determine the long-term impact of stilling on power generation requires assessments at the typical height of commercial wind turbines. ❐

Tim R. McVicar is in the Land and Water Division, Commonwealth Scientific and Industrial Research Organisation, Clunies Ross Drive, Acton, ACT 2602, Australia. Michael L. Roderick is in the Research School of Earth Sciences and the Research School of Biology, The Australian National University, Canberra, ACT 0200, Australia.
e-mail: tim.mcvicar@csiro.au; michael.roderick@anu.edu.au

References

1. Roderick, M. L. *et al. Geophys. Res. Lett.* **34,** L17403 (2007).
2. Vautard, R. *et al. Nature Geosci.* **3,** 756–761 (2010).
3. Zheng, H. *et al. J. Geophys. Res. Atmos.* **114,** D24105 (2009).
4. Wentz, F. J. *et al. Science* **317,** 233–235 (2007).
5. Pryor, S. C. *et al. J. Geophys. Res. Atmos.* **114,** D14105 (2009).
6. McVicar, T. R. *et al. Geophys. Res. Lett.* **37,** L06402 (2010).
7. Griffin, B. J. *et al. Geophys. Res. Lett.* doi:10.1029/2010GL045052 (in the press).
8. Shuttleworth, W. J. *et al.* Q. J. R. Meteorol. Soc. **135,** 1230–1247 (2009).
9. Ramanathan, V. *et al. Proc. Natl Acad. Sci. USA* **102,** 5326–5333 (2005).
10. You, Q. L. *et al. Clim. Res.* **42,** 57–64 (2010).
11. Donohue, R. J., McVicar, T. R. & Roderick, M. L. *J. Hydrol.* **386,** 186–197 (2010).

HYDROLOGY

Missoula's legacy

The Channeled Scablands of the northwestern United States stand in sharp contrast to the surrounding wheat fields. Here, tortuous channels cut deep into the dark volcanic bedrock, giant gravel ripples reach nine metres in height, and piles of rock debris dot the landscape. The hunt for the origins of the alien landscape began nearly 90 years ago and finally led to the discovery of the former glacial Lake Missoula. From at least 19,000 to 13,000 years ago, the lake sat along a finger of the Cordilleran ice sheet. But the lake was far from stable: at least 25 times during that period, the ice that dammed the lake disintegrated, and water gushed towards the Pacific Ocean.

© ISTOCKPHOTO / CATSCANDOTCOM

The floods may have left behind more than just a scoured surface. Jennifer McIntosh and colleagues at the University of Arizona suggest that flood waters also filled the region's aquifers on their way to the ocean (*Geophys. Res. Lett.* doi:10.1029/2010GL044992; in the press). The aquifer system, known collectively as the Columbia River Basalt Aquifers, stretches across the eastern half of Washington state and northeast Oregon and is an important source of both domestic and agricultural water. Very little water has been added to the system recently, and the bulk of the water is thought to be a remnant from the last glacial period.

Yet, an ice-age source of groundwater is hard to reconcile with data that suggest the climate then was even more arid than today. Instead, based on radiocarbon- and oxygen-isotope measurements of the groundwater, McIntosh and her colleagues suggest that it came from Lake Missoula. The radiocarbon dates from the groundwater match the dates of the floods and coincide with periods when vast amounts of fresh water poured into the Pacific Ocean. Furthermore, the oxygen-isotope composition of the groundwater more closely resembles the proposed composition of the Cordilleran ice sheet than that of rain or snow during the glacial period.

The rushing flood waters must have been able to infiltrate the aquifers rapidly, draining through fractures and faults, and perhaps eroding inlets into the aquifers.

ALICIA NEWTON