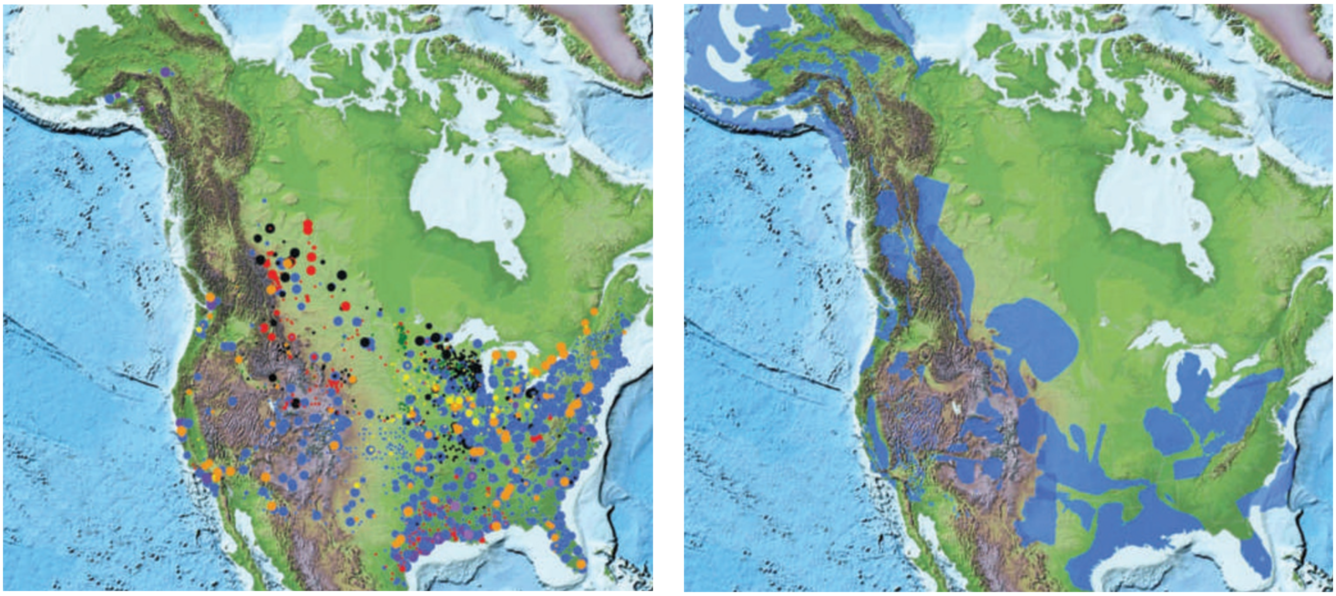

NETL/DOE

SNAPSHOT
Carbon stores

A newly updated atlas from the US Department of Energy shows how North America might store its excess carbon dioxide — if it could figure out how to do so.

On the left is a map showing many of the known stationary CO_2 sources in the United States and Canada. Blue represents electricity generation, with many power plants clustered in the east and midwest. Orange represents cement manufacturing, including groupings in southern California. Red indicates petroleum and natural-gas processing, showing up most starkly as the Alberta tar sands in Canada.

Potential reservoirs for sequestering much of the CO_2 from such activities could be deep saline formations (above right, in blue), or layers of rock permeated with brine. The new atlas estimates that saline formations could hold anywhere from 920 billion–3,400 billion tonnes of CO_2. This dwarfs the potential for existing oil and gas reservoirs (82 billion tonnes) or unmineable coal seams (156 billion–184 billion tonnes).

Yet turning saline formations from dream reservoir into sequestration reality remains a challenge. In Alberta, a consortium is in the process of identifying potential formations for a test project to begin in 2009. ■

Alexandra Witze

Electron 'bump' may confirm dark matter

A high-altitude balloon experiment above the Antarctic seems to have seen a possible signature of mysterious 'dark matter', similar to that spotted earlier this year by a European satellite.

The Advanced Thin Ionization Calorimeter (ATIC), an experiment to search for charged particles from space, has spotted a surplus of high-energy electrons coming from somewhere in the cosmos (see Letter, page 362, and News & Views, page 329). Although the interpretation is far from certain, the electrons could be produced by dark matter — previously undetected particles that physicists believe make up 85% of all matter in the Universe.

ATIC's findings are similar to data from the PAMELA (Payload for Antimatter Matter Exploration and Light-nuclei Astrophysics) satellite mission, a collaboration between Italy, Russia, Germany and Sweden that spotted an excess of high-energy positrons, or anti-electrons, at roughly similar energies (see *Nature* **454**, 808; 2008). "In several respects the two measurements complement each other," says John Wefel, head of the ATIC collaboration and a physicist at Louisiana State University in Baton Rouge.

Wefel's team looked at data from two multi-day ATIC missions flown between 2000 and 2003 some 35 kilometres above the Antarctic ice. With 99.5% of Earth's atmosphere beneath them, the missions measured electrons that come from various galactic sources such as exploding stars. As predicted by theory, the experiment saw fewer electrons at higher energies. But between 300 gigaelectronvolts and 600 gigaelectronvolts, the number of electrons rose sharply before falling off to background levels.

NASA

Several experiments may have found dark matter, the existence of which is inferred here (blue).

PAMELA's results, as posted on the arXiv preprint server last month (O. Adriani *et al.* http://arxiv.org/abs/0810.4995; 2008) and also submitted to *Nature*, show positrons increasing up to 100 gigaelectronvolts. Although the collaboration did not report beyond this energy level, some suspect that the number of positrons may continue to increase at higher energies. And, because the PAMELA and ATIC data were measured in different ways, researchers believe that their findings probably confirm each other.