



Nelson Boustead, NIWA

250 million data records and rising

Hourly and 10-minute climate data are collected every day from many of 2820 monitoring stations around New Zealand, the Pacific, and Antarctica, and added to NIWA's National Climate Database.

The database already contains over 250 million individual data points, and features information on rainfall, earth and air temperature, wind, soil moisture, evaporation, solar radiation, sunshine, pressure, and humidity.

Records for two stations go back to before 1855, by 1900 climate records were being kept in over 200 sites, and the database contains information from over 7470 locations, many of which are no longer taking measurements. The longest running site, which opened in 1864, is in Christchurch Gardens and data is still being collected there 143 years later.

Until this year, access to the database was limited and charged for, with fewer than 150 regular users. In July this year, much of it became available free and two months later user numbers had increased to over 900, and are rising every day. In the first two months more than 40 million rows of data had been downloaded, six times more than in the same period last year.

How fresh are things in Doubtful Sound?

Continuing monitoring of the impact of freshwater into the Doubtful-Thompson-Bradshaw Sound system from Meridian's Manapouri power scheme is carried out by NIWA and the Cawthron Institute. Monitoring is required to ensure the Fiordland ecosystem is not being stressed or altered by the freshwater input.

NIWA's Ian Maze said the ecosystem is used to dealing with sudden increases in freshwater layers, produced by the region's big annual rainfall and huge natural runoff, but the Manapouri power scheme outflows subtly change the situation through a more continuous input of freshwater. To date the extensive monitoring has not identified any ecological effects following the operation of the second tailrace tunnel.

When the Manapouri scheme began back in 1969, it was recognised that an initial impact might occur. New baselines have been established with the recent re-consenting of the scheme in the mid 1990s for use in future scheme management. Hourly salinity and temperature measurements at 10 depths are made at some locations, while hourly rainfall, air temperature, and wind speed and direction are recorded at others. The second Manapouri tailrace means up to 510 cumecs can now be discharged at times as opposed to the previous 465 cumec normal limit with the single tailrace.



Ian Maze, NIWA

River gauging gets smart

Acoustic Doppler current profilers (ADCPs) are transforming the way we gauge the flow of rivers, and a nifty device developed by NIWA is making the job even easier.

ADCPs are sophisticated echo-sounders which can measure water depth and velocity across a full cross-section of a river. Older methods typically involve an operator gauging the river at selected points while wading, standing on a bridge, or even suspended in a cable car.

By using a large ADCP mounted on a jet boat, we can much more accurately gauge big rivers like the Waikato, but we also use ADCPs mounted on a 'float' to gauge smaller streams.

The manufacturer's recommended method for deploying a float-mounted ADCP involves an operator dragging the float back and forth along a line strung across the stream. This is tedious and difficult because each traverse of the stream must be smooth, constant, and slow.

Andrew Willsman of NIWA's Dunedin branch office invented a remote-controlled 'traveller' which moves the float at very slow, steady speed, ensuring high quality flow measurements. At one site where we were getting 10% or more variation in flow measurements between traverses, we get just 2% variation using the traveller.

The traveller has been further developed by NIWA Instrument Systems and is now available for sale.



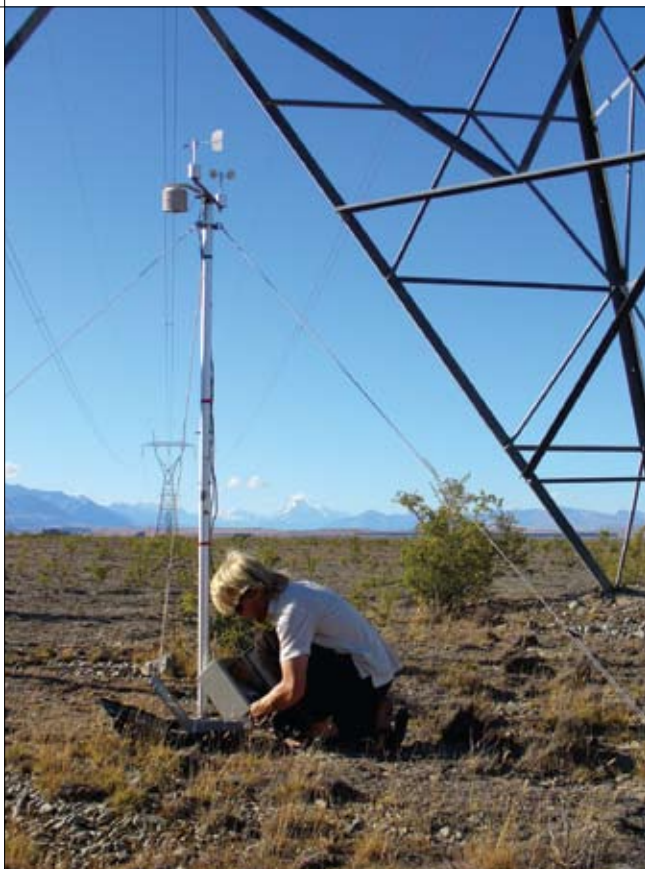
Andrew Willsman, NIWA

Power lines surveyed

NIWA staff recently covered thousands of kilometres in the backblocks helping to survey a number of power transmission lines which form part of the national grid.

The survey information will enable the grid owner/operator, Transpower, to better understand and manage the effects of temperature on existing transmission lines. Lines expand and sag as they get warmer. Their temperature depends on the heating effect of the electrical current flowing through the line and on prevailing weather conditions (sunlight contributes to heating; wind contributes to cooling).

Surveying was carried out using a helicopter-mounted laser ranging instrument (LIDAR), operated by a Russian company, Opten, working through their NZ agent, Power Systems Consultants. The LIDAR accurately locates the lines, and 'line sag' can be calculated under known conditions. NIWA's involvement was to provide, deploy, and redeploy more than twenty portable meteorological monitoring stations along the transmission line as it was being surveyed, recording wind, solar radiation, and air temperature. Between 100 and 200 km of line were covered most days. NIWA also used a small balloon-borne weather station to get a vertical profile of conditions around transmission line heights. In combination, these data enable a complex meteorological model to derive the line temperature and performance characteristics for each of several hundred spans each day.



Steve Le Gal, NIWA

NIWA's Shane Rodwell downloads data from a portable meteorological monitoring station near Twizel during the power transmission line survey. Aoraki Mt Cook is in the distance.