

Space storms will make waves

Besides the dozens of weather stations dotted around our country there is one other that is rarely heard from.

It is the Learmonth Solar Observatory near North West Cape where a continuous watch is maintained on space weather, which is governed by the state of the Sun.

Whenever a large flare or other outburst disturbs the surface of the Sun, heralding a spell of bad weather in the solar system, a storm warning goes out from Learmonth, not only to Australia but the rest of the world as well.

The Learmonth Solar Observatory is a joint facility with the Americans, who have provided most of the equipment and funding.

The Australian contribution is supported by the Radio and Space Services section of the Ionospheric Prediction Service (IPS), which has its headquarters in Sydney.

Radio propagation at short-wave frequencies depends on the state of the ionosphere, a layer of charged particles high in the atmosphere.

When the ionosphere is disturbed by the impact of storms in space short-wave radio transmissions are upset.

That explains the connection between the IPS and the Learmonth Observatory.

The observatory director is Dr John Kennewell, a distinguished physics graduate of the University of Newcastle.

He is an expert on solar physics and phenomena occurring in the upper atmosphere, the right combination of talents required in such a position.

At the moment he is keeping a very close watch on events because the 11-year cycle of sunspot activity is approaching its maximum. Although there have been no extreme events so far this cycle, Dr Kennewell warns that a violent space storm could strike at any time in the next year or so.

He points out that so far 'we haven't had any of the big events that have wrecked communication links, taken out powergrids and melted satellite systems like we had last time'.

In 1980 power was cut in Quebec for nine hours and 1972 New York City was blacked out for a day.

These outages followed violent explosions on the surface of the sun that hurled a gale of radiation earthwards, taking some hours to transit the 150 million kilometre distance. The optical and radio monitoring of the solar surface gives warning of the approach of these disruptive radiation tornados.

Spacecraft operators, defence forces, power and telephone utilities, long-distance pipeline owners, air services and even the flying doctor service all take heed of the warning from Learmonth passed on by the IPS.

Usually when there is enhanced activity on the sun, clouds of charged particles rain through the openings near the magnetic poles of the Earth's magnetic field.

On striking the rarefied upper atmosphere the particles create eerie glows known as auroras mainly in regions surrounding the poles.

When the activity is particularly intense the auroral zone, as the region is known, expands north-ward from the south magnetic pole.

Then Tasmanians see the full beauty of the aurora. On rare occasions mainland Australia is treated to an auroral light show and Newcastle could get lucky.

Dr Kennewell suggests that the forthcoming peak in the sunspot cycle could produce an event of such intensity that auroras might be seen as far north as Cairns.

But their beauty will only be displayed to country folk. Auroras are seldom bright enough for city dwellers to notice.

When the sky is unnecessarily lit up at night we not only lose much of the beauty of the stars, but other wonderful phenomena as well.

written by Dr Colin Keay - 24th June 2000

[Learmonth Solar Observatory](#)