



*Dr Martin Truffer takes a breather at the upper MAWS201 site, on the way to survey marker canes at 1200 m asl. Behind him, winds whip up drift snow and batter the upper slopes.*

## Vaisala AWS Conquers Heard Island in Southern Indian Ocean

Heard Island is remote – really remote. Very few people make the effort to travel the 4,350 km southwest of Perth, Western Australia, to visit this 2745 m high active volcano. Yet it is a fascinating place, particularly for glaciological monitoring, and gleaning information on the effects of climate change.

**P**rior to the Australian Antarctic Division's second field season in the austral summer of 2003-04, our glaciology program decided that we needed a light, easily deployable automatic weather station (AWS) that could log data, and

yet was robust enough to withstand what we knew from experience were extreme conditions.

### **In-house design battered to ruins**

We had erected a four meter in-house designed AWS at a height

of 550 meters above sea level in our 2000-01 field season. These units are designed for the cold and dry conditions of the Antarctic, and the majority of sensors failed after a couple of months, probably due to repeated freeze-thaw events common on subantarctic Heard Island. We did recover temperature and solar radiation for a period of 669 days before complete failure.

When we revisited the site three years later, it looked like someone had been throwing rocks at the unit. The aluminum tower was deeply pitted, the two

meter T sensor had taken a direct hit from some large airborne object, the battery box had a layer of internal ice, and the wind speed sensor was nowhere to be seen.

### Up the mountain by foot

Whereas we had had the services of a helicopter to deploy our tower, our most recent field season was all foot and backpack work. We were interested in recording foehn events, which are particularly dramatic on Heard Island.

We chose the Vaisala HygroMet™ Automatic Weather Station MAWS201, and deployed two units, one at the terminus of our main study glacier, and the other on a small rock outcrop at 922 meters. This latter unit was going to have to endure the worst of the weather, and was the highest any instruments have been deployed on the island to date.

Three people carried the various components up the mountain from our sea level campsite, additionally weighed down with survival gear and roped together for glacier travel.

I was responsible for securing both units on site, and used a combination of climbing tape, Hessian bags filled with local gravel, and some very heavy boulders, to almost bury the lower supporting tripod. As we got blown back down the mountain in an increasing gale, I hoped I had done enough to keep them in place on the smooth rock pavement. It was nine days of worrying before I got to see that the upper MAWS201 was still standing, and I cheered with delight!

### Enduring wind gusts of 234 km/h

I downloaded the data from the units using a laptop, and by hiding in a windproof and almost waterproof dark bag was better able to see the screen in a very bright environment. The MAWS



terminal program made downloading data simple.

On return to the upper unit, after a particularly violent storm, the tipping bucket rain gauge and T/RH sensor arm hung limply alongside the unit, remarkably still connected by their data cables. A quick field fix saw the T/RH sensor moved to the pyranometer arm, and the rain gauge retired. In fairness to the MAWS201 unit, it had done pretty well to even stay in place when analysis of the data found it had endured a maximum wind gust of 65.1 m/s (234 km/h) during the storm.

### MAWS201 – still standing

With the high cost and logistical complexities associated with getting to a place like Heard Island, the last thing you need is equipment failure. We were really impressed with the MAWS201 units, and are still analyzing the data collected during our 44 day field season. In something of an experiment, we have left the low-

er unit in place, logging average conditions every six hours. If we are lucky, it will still be there when we hope to return in three years time. ●

*Upper MAWS201 site.*

*Doug Thost downloading data to laptop using a lightweight bivvy bag for wind protection, light reduction, and computer protection.*

