

Dr Stuart Godfrey

1999 Sverdrup Gold Medal Winner

An Australian climate researcher whose investigations into links between oceans and atmosphere advanced the understanding of El Niño has been honoured with a coveted US research award. Dr Stuart Godfrey, an oceanographer based in Hobart with CSIRO Marine Research is the 1999 winner of the prestigious Sverdrup Gold Medal, awarded by the American Meteorological Society.

A 30-year veteran of research into the way the tropical Indian and Pacific oceans influence regional climate, Dr Godfrey said Australian climate research is making significant advances.



“When I started in this field, often we didn’t know where our research ship was within a range of sixty miles. Now, terabytes of satellite data arrive each day, and we can use it - for any part of the world, every ten days - to do a better job of describing the shallow ocean than we could have done from our ship. This is turning climate forecasting into a serious tool. We’ll never have perfect forecasts because of the dreaded ‘Chaos’ phenomenon but in about ten years, we should be approaching the limit of predictability,” Dr Godfrey said.

Dr Godfrey believes the next decade of oceanographic studies overseas and in Australia should see fundamental research of the last three decades translated from theoretical simulations into valuable, practical tools for use by the Australian community.

“Knowing more about the influences on Australian climate is already one area of substantial benefit of oceanographic research while others will range from defense to the sustainability of fisheries resources, ocean engineering, environmental protection and search and rescue,” he said.

The Sverdrup Gold Medal is awarded by the American Meteorological Society (AMS) to a researcher who makes outstanding contributions to the understanding of interactions between the oceans and atmosphere. It is named after the ‘father’ of oceanography Harald Sverdrup, who also gives his name to the measurement of ocean currents and has become the cornerstone of scientific understanding of ocean circulation.

Unlike other awards, the Medal is awarded by the President of the AMS on the advice of an international committee including representatives from the Scripps Institution of Oceanography, California, and the University of Bergen, Norway, the former research affiliations of Harald Sverdrup.

Dr Godfrey’s career has paralleled the development of oceanography as an increasingly important science in Australia, with few Australian oceanographers investigating ocean dynamics until the 1960’s. Armed with a degree in high-energy physics, Dr Godfrey joined CSIRO in 1969 when the organisation advertised for a ‘physicist or mathematician’ to study the East Australian Current.

He wrote one of the first papers on the ocean’s role in the El Niño Southern Oscillation (ENSO) phenomenon, and became integrally involved in major international research programs such as Tropical Oceans-Global Atmosphere, conducted in the Pacific.

As well, he developed a tide gauge network around New Guinea to establish sea level, at the same time as he and colleagues promoted and worked to establish a volunteer network of commercial shipping companies to measure the oceans around Australia. With only one oceanographic research vessel of its own, scientists became increasingly reliant on this network for observations of ocean dynamics and more than 40,000 have since been generated from the tropical Indian and Pacific Oceans to the Antarctic Shelf.

That research has helped support the contention that small winter-time variations in sea surface temperature have significant impacts on Australian spring rainfall. Together with colleagues at CSIRO Marine Research, Atmospheric Research and the Bureau of Meteorology his research through the last decade has centred on the Indonesian Throughflow – a system of currents linking the tropical Pacific and Indian Oceans – and its effects on the oceans around Australia.

In particular, he showed that if the Indonesian through-flow were blocked, the major ocean current off Western Australia - the Leeuwin Current - probably would not exist at all, and Western Australia might be like other western continental shores, with anchovy instead of rock lobster as their principal fishery.

Dr Godfrey has had a far-reaching impact on the way oceanographers and atmospheric scientists now think about the two-way interaction between the ocean and the atmosphere, this interaction lying at the heart of the El Niño phenomenon. Using his deep insight on ocean dynamics he developed (and published in 1990) a very simple method for using integral properties of the wind stress to deduce the strength of the world's ocean currents. This has focused the minds of both oceanographers and atmospheric researchers on which parts of the wind field are important to the ocean, and this technique has now developed into a standard diagnostic tool for ocean models.

Dr Godfrey has led numerous research expeditions on Australia's oceanographic vessel, the Franklin, the most recent in 1996 to a region near Sumatra, which was being treated as a 'rain gauge' for Australian climate.

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