

THE CHRISTMAS ISLAND STUDY

- Ken Grimes

In March - April of this year a group of six karst scientists spent two and a half weeks on Christmas Island, in the Indian Ocean, doing a study of the Biology, Hazards and General Management of the island's caves and karst. This was done for Parks Australia North, so as to assist them in preparing a management plan for the National Park which now covers a large part of the island.

The team involved Bill Humphreys and Stefan Eberhard, who studied the cave biology, Ken Grimes and Dan O'Toole, who looked at the geological hazards, and Andy Spate and Rauleigh Webb who looked at other hazards and cave and karst management in general. The study was coordinated on the island by Paul Meek of Parks Australia North - who did an excellent job of arranging transport and accommodation (in the "Pink House"), and introducing us to various island personages, including some of the local cavers & divers (those two occupations go hand-in hand on this island). WASG had run a caving trip to the island in 1987 and Rauleigh organized compilations of their cave maps, and those made by early island speleologists in the 1960s. These made our work much easier.

The island is an old volcano with a limestone capping that is rising out of the Indian Ocean at a rate of 0.14mm per year and drifting north towards Indonesia at 8 cm per year (hang onto your hats, folk). We noticed in several places large anchor chains running out from the island cliffs into the deep water - presumably this was a desperate attempt to stop the drift, as the island is going to fall into the Java Trench in just four million years time. A consequence of the uplift is a series of terraces cut into the steep and cliffy sides of the island.

Most of the big caves are at sea level, and many are entered by swimming from a boat, and you continue to swim or wade through most of the cave length (which is why most of the local cavers are also divers). The longest has 2.5 km of mapped passage, and many unexplored leads. These coastal caves are horizontal joint-controlled passages with irregular, sharp, phreatic spongework walls formed by mixing of fresh and sea water within the tidal range. At intervals they are punctuated by massive rockpile chambers. The caves have some very well decorated parts, but these are difficult to reach. Higher up one finds uplifted systems that formed at

past sea levels, and on the plateau there are some horizontal stream passages. We also saw fissure caves behind cliffs that might have resulted from mass-movement, and there is one cave reportedly developed in basalt - but unfortunately its entrance was filled in some years ago so it is no longer accessible.

The caves and associated springs are the main source of fresh-water for the islanders. Thus some entrances are marked by a pump house, and you enter down steps or metal ladders. The early cave exploration in the 1960s was partly done as a search for water supplies - though some comments in the reports suggest that the explorers were enjoying their job beyond the call of duty.

The Parks staff were worried about local cavers having accidents in the caves, so Andy, Rauleigh and Stefan arranged a couple of evening sessions and a weekend of talks and practical training in techniques, safety, and the principles of minimum impact caving. It seems that a local caving club may form with affiliation with WASGA.

Some special hazards of these caves include swimming through the waves at the sea entrances, getting cut off by the tide if you delay your exit, having to manoeuvre past pumps and electrical equipment, face-to-face meetings with robber crabs that have a claw span up to half a metre, and being eaten alive by the mosquitoes while belaying in the surface dolines. We also found foul air in the plateau caves; something that had not been reported before so perhaps it is just a seasonal thing. Half way through the job one of the Geological Hazards investigators got over-involved in his work and gave the parks staff a first hand demonstration of the hazards of loose rockpile - he spent the rest of the trip on crutches (I won't mention names here to avoid personal embarrassment, but I guess the rest of the team will blab).

Just for variety, the locals arranged for one of their large diesel tanks at the port to burst its bottom and dump 60,000 litres of fuel into the limestone terrace. Andy became involved for a day in emergency containment and clean-up operations, and arranged some drilling that identified limestone cavities with 10cm of fuel floating on water! A coffer dam was built on the tidal platform where the diesel was leaking slowly out of the cliff into the sea.