2 APR 1993

2 APR 1993

REPUBLIC OF VANUATU

VANUATU METEOROLOGICAL SERVICE

Private Mail Bag 54, Port Vila

Telephone : (678) 22331, 22932, 23868
Telex : (771) 1106 METEO NH
Fax : (678) 22310

VMS

JB-DM/3576

TROPICAL CYCLONE " PREMA" —A BRIEF PERSPECTIVE FROM THE METEOROLOGICAL OFFICE.

Following the very active cyclone season of 1991-1992, attributed to the El- Nino conditions that existed at that time, it was expected that there would be a less than average frequency of tropical cyclones in the 1992-1993 season. That expectation looks to be correct , even now.
For a few weeks now, in fact, we had been quite *hopeful* that there would be no cyclones at all, since the nominal end of the cyclone season was drawing closer. " Prema" finished that.
On Friday 26th march a tropical depression that we had been watching for a couple of days began to show a litte more organisation . The system was drifting westwards at about 10 knots. Because it had cyclone potential, we issued an Information Bulletin at 5pm that day just to alert the public that something suspicious was out there, in other words, keep an ear on Radio Vanuatu for further developments.
So information bulletins were issued regularly from then on.
The system was named cyclone " Prema" late on Saturday by the Nadi Meteo Office.
The first advisory message , indicating the risk of gales in central and southern Vanuatu within 48 hours was issued at 7am Sunday morning. During Sunday, Prema continued to intensify and continued to move slowly southwesterly.

At the time of the issue of the first advisory, there were strong northwesterlies in the upper atmosphere just ahead of the track of "Prema". We also received a computer prediction suggesting that Prema would shift to a more southerly track. Mainly for these reasons, it seemed that Prema might swing more to the south in the following 24 hours, but exactly when was the question we couldn't answer for sure. Obviously our forecast policy had to be structured to accomodate either the southwest or southerly movement.
When early on Monday morning it became clear that the slow but steady southwest movement seemed likely to continue for the rest of that day, it became necessary to issue the first full tropical cyclone warning. Experience shows that response to warnings is best when the warnings allow as much daylight time as possible for people to respond . The met office sought and got immediate full cooperation from Radio Vanuatu to assign maximum priority to all warnings.
Because of the potential seriousness of the situation this early morning warning was given the title " Flash Tropical Cyclone Warning no 1 ".

Our own estimates and those of the Nadi office in Fiji, with whom we have a close working relationship, were for average winds of 80 to 90 knots with gusts of about 100 knots. The evidence now suggests that our warning estimates were reasonable, at least for Pt Vila. There were far higher estimates of wind strengths made by 2 other overseas meteorological offices. These estimates were for average winds up to 125 knots with gusts to 145 knots. The available facts do not support the occurrence of mean winds of anywhere near this figure in Pt Vila during cyclone "Prema". The maximum gusts recorded in Vila and at Bauerfield ,which unfortunately were not recorded at the time of maximum wind strength
(power outages and wind damage caused the sensors to fail) were about 80 knots. We believe that maximum wind gusts up to about 100 knots or perhaps a little higher would be a reasonable estimate for Pt Vila, although obviously such estimates are subjective.
The newly installed tidal monitoring gauge at the main wharf — which was unfortunately damaged by a wandering barge—functioned well throughout the whole event, and the maximum recorded gust there was the surprisingly low figure of 72 knots. Because of the less than ideal exposure of the site, it is clear that actual gusts in more exposed sites would have been much higher.
We must emphasise that any suggestion that the average wind strengths in Pt Vila during cyclone Prema were substantially higher than those forecast, that is for mean winds of 85 knots ,is not supported by the available evidence. If anything, we believe that the mean winds were probably a less than the 85 knots forecast.
For example, the evidence is that "Uma" was significantly stronger that "Prema". The estimate of the maximum average winds in "Uma" was about 90 knots.

It is true that following the recent hurricane "Andrew" in the United States, that investigators found evidence of local tornados within the eye wall, which could easily cause higher wind *gusts* than those otherwise expected .
Certainly no-one can rule out the possibility of this happening with cyclone Prema, or with any other cyclone for that matter, but there is no way of forecasting these events with current technology.

Throughout the day and the evening of the 29th March, destructive winds were forecast to reach Efate by about midnight, with very destructive winds to follow as the morning proceeded as the cyclone centre came closer. The National Disaster Office also had a chance to use its new colour coded alert system which to a large extent is based on the cyclone warnings from the Meteo. This system has replaced the old triple red light system that was used in past years, and which was controlled by the Meteo, before the creation of the National Disasters Officein 1991.
The Meteo Office is not responsible for the actual issue of these advices. They are special community alerting signals which are designed to develop the level of community preparedness in line with the level of threat being posed. The alert status is determined by the National Disasters Organisation based on other considerations apart from just the warning. Queries on the alert status and required community responses before, during or after cyclones should always be

referred to the National Disasters Office, and NOT the meteorological office because the determination of the alert status involves specialised decision making processes that the Meteo does not now become involved in after it has issued the warning. Following the cyclone, we were informed by the National Disasters Office, that, on the whole, the community response response to the alerts issued was mostly satisfactory. As always, though, there were apparently a few cases where organisations did not take enough protective measure commensurate with the alert status. Our own assessment of the battening down of Pt Vila town during the day prior to the cyclone was that people took the warnings and community alerts very seriously indeed. One could be forgiven for imagining that the town was preparing for a nuclear attack.

Obviously, we hope that people understood and responded to all the advices as best as they were able to.
Some of the problems that the Meteo faced were as follows.
In spite of the savage intensity of the storm near the centre, Prema was not a large cyclone. For example, had the storm passed just 60 miles away, which it could easily have done, people in Vila at least would have regarded it as a minor event, gales might have only barely been felt in the city, and so there would be a tendency for people to think the forecasts were overdone. Also, we could have conceivably put out the first full warnings on Sunday, when the storm was moving very slowly, in fact for many hours it was virtually stationary. This would have put added extra strain on all of our resources, on Radio Vanuatu, the Disaster Office , not to mention that the town would have to have battened down so much earlier. The fine line between a risk of gales within 24 or within 48 hours is a very difficult one to draw and has to be balanced with many other considerations, not the least of them the limitations on the accuracy of cyclone prediction.
It may stagger the non-scientific person to be told that the average position error world-wide in the 24 hour prediction of cyclone centre position is 200 kilometres. That is why we usually have to warn a fairly large area in our cyclone warnings, knowing full well that some of the areas mentioned in the warnings may not be affected at all, depending on the cyclone track, cyclone size, or cyclone intensity . The same is true everywhere in the world, and it is not just a matter of superior or inferior technology. It is a fact of life that many of the parameters about cyclones remain difficult or impossible to predict, even in 1993.
It is also a fact that cyclones in the south Pacific tend to be more erratic than in cyclone basins elsewhere in the world.
Anybody who has lived in Vanuatu for a while should be able to verify this!
This peculiarity is partly due to a discontinuity in the subtropical ridge with height, which basically means that cyclones here are often subject to rapidly fluctuating steering winds during different phases of their life cycle, leading to wild and unpredictable motion changes, sometimes even describing complete loops.

One of the major difficulties that our Meteo Office faces here is that the forecasters working area is far too small. In the days or

4

hour leading up to a cyclone strike, the met office is visited by scores of interested people wanting to know the latest, some of whom come in 2 or 3 times a day. They are our friends, our customers and as such are the reason for our existence and will always remain welcome. We do our best to serve them, but it can be very difficult to say the least to try and concentrate on the incoming information and prepare warnings when you are distracted by a constant stream of visitors all wanting to know the latest.
To be fair, most people are understanding and just come in to pick up a tracking map or forecast, maybe ask a quick question or two , then leave. It is not their fault that the office is too small.
Our ultimate aim is to set up a proper briefing office to handle our ever welcome customers in a dignified and orderly manner, but we may be a little while in accomplishing this.
In short we need a new office.
In spite of the fact that we have upgraded our satellite imaging systems recently, we lack the ultra sophisticated equipment to take hourly high resolution images. For this reason we try to get updated centre positions from Fiji during critical periods, and normally this is readily provided. Sometimes quality assistance is provided by Brisbane also, though Brisbane is not required to do this under the Tropical Cyclone Work Plan for the Pacific.
To do this, however, requires communications, ie fax or telephone. Most regrettably, in the early hours of Tuesday morning when Prema was lauching its attack, our emergency generator failed. Some of our staff risked their lives by exposing themselves to highly dangerous storm force winds and flying debris in trying to get it going again, but it was not possible. This meant that we could not get any further information of any kind, and of course we could not receive our own satellite imagery, so we were unable to give meaningful warnings at that time. In any case we would have been unable to distribute the warnings. At the time of this event, we had the secretary of the Vanuatu Amateur Radio Operators Association present who had set up emergency communication links with Australia and New Zealand. Unfortunately, the loss of emergency power meant that this link failed also. Later in the morning, he was able to restore this link with the use of heavy duty batteries and we resumed sending out warnings. We regret any worry or inconvenience that this period without warnings may have caused and we will look at ways of overcoming it next time.
Another very serious problem that we faced for the whole period of cyclone "Prema" was that our normal communication link with Nadi was completely defunct. We literally had no observations or traffic coming down the line at all. To repeat, this was for the whole period of tropical cyclone "Prema". In other words, we couldn't even draw a weather chart. This was due to a problem in Fiji, and nothing to do with Vanuatu at all. So we had to rely on charts and other data being faxed to us, mainly by Fiji. This itself was a very awkward and inefficient arrangement, since our fax was occupied much of the time trying to dispense our warnings. Somehow we got enough data to make reasonable conclusions. The meteorological office in New Caledonia realised our plight, and sent us a lot of very valuable information down the fax line, including their own forecasts, which were very helpful. Brisbane, through a former meteorologist and Assistant

5

Director of the Vanuatu Meteo Service, Mike Bergin, also provided us with valuable information. Thanks Mike.
The Vanuatu Meteo service [redacted] can only draw on a maximum of 4 or 6 forecasters to draw to cover every phase of the operation. Our weather obervers, together with the forecasters, have to be telephonists, telex operators, clerical asaistants, receptionists, radio broadcasters, you name it.
It is a small, but nevertheless efficient service staffed by dedicated people who are proud of the job they do. We faced major difficulties during cyclone Prema but we still hope and believe most people got adequate warning.
Our deepest sympathies go to those who suffered badly during this shocking storm.

Henry Taiki, Director; Steve West, Assistant Director , on behalf of the Vanuatu Meteorological Service.

TROPICAL CYCLONE TRACKING MAP

Vanuatu Meteorological Service
and
QBE Insurance
(Vanuatu) Ltd.

Yu mas listen gut long ol mesej bhoat Tropical Saeklon taem oli stap talem aot long Radio Vanuatu. Long taem blong Saeklon sison yu mas traem oltaem blong lisen long Nius Bulletin wan taem long wan dei.

Radio Vanuatu emi stap brodkas long olgeta frikwensi ia.

Sotwef sevis :
5.45 am - 10.00 am 3945 kHz
9.00 am - 6.00 pm 7260 kHz
5.00 pm - 10.15 pm 3945 kHz

Midiam wef sevis :
Ol dei 1125 kHz

Wan wan mesej long Seaklon bae i talem yu wea nao Saeklon emi stap mo ples we bambae emi muv iko long hem.

Sipos yu lisen gut bae yu save plotem ol posison long Saeklon stret long Map ia we oli kolem "Map blong Traking".

Ol posison bae oli stap kivim nomo long ol leta mo namba, olsem B2 mo D10 we yu save folem olgeta sipos yu luk long map blong yu.

Olsem exampol, Efate Aelan emi stap stret insaed long skuea H7.