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It is Difficult to Predict Earthquakes in the Central New Hebrides Island Arc.

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From September 1978 to July 1986 ten main shocks in the magnitude (Mw) range 5.8 - 7.1 occurred in the region of Efate Island in the New Hebrides Island Arc. Analysis of the seismicity recorded by the ORSTOM - Cornell local network reveals an intricate time-space pattern. Striking differences in the pre- and post-main shock activity are associated with location of the events along the dip of the interplate boundary. The 6 main events ($5.8 \leq M_w \leq 6.2$) that occurred in the downdip part of the interplate boundary were not preceded by any obvious long- or short-term precursory activity. These events are followed by normal to small sized aftershock zones or no aftershocks at all. All the main shocks ($6.2 \leq M_w \leq 7.1$) located in the updip part of the interplate boundary were followed by large aftershock zones. Clusters that occurred few months before these main shocks can be interpreted as long-term precursory activity. However, the same zone was activated before two events that occurred at different places, while two different zones were activated before two events that occurred at the same place. Short-term precursory seismic sequences were also recorded during the days preceding the updip events. Only one of these foreshock sequences is outstanding. However, another outstanding cluster occurred at the same place as this foreshock sequence, with a very similar space-time development, but did not lead to a major event. It is also impossible to use the precursory activity to estimate the magnitude of the events. Thus, precursory seismic activity clearly appears before the updip mainshocks but is, so far, too inconsistent to predict the occurrence of major earthquakes. It seems that the seismicity in the Efate region is controlled by the seismic sequences (i.e. not only the major events) that occur in the updip part of the interplate boundary.

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