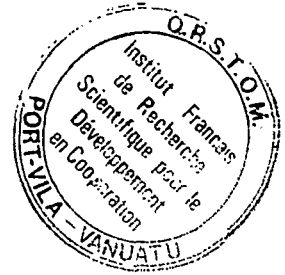


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Detailed Study Of a Moderate Size Earthquakes Episode in the Central New Hebrides Island Arc

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The region of the New Hebrides convergent interplate boundary near Efate and Malekula islands is characterized by an unusually high level of seismicity for moderate sized events (magnitudes less than 7). In 1978, after 4 years of quiescence, a magnitude 6 event commenced an episode of seismicity including eight events with $5.8 < M_s < 6.3$ and one with $M_s = 7.1$. The Cornell-Orstom network started operating 2 weeks after the first event and caught most of the episode, accumulating 6 1/2 years of continuous seismic coverage of events with magnitude greater than 2.5. The episode included (1) a precursory sequence in 1978 and 1979, (2) a 1.5 year period of quiescence in 1980 and 1981, (3) the 1981 magnitude 7.1 event and its aftershocks, and (4) a post seismic episode in 1983-1984. The precursory episode showed a progressive northward development towards the region of the 1981 earthquake, while the postseismic episode developed mainly outside but adjacent to the area involved in the 1978-1981 sequence. The spatial development of the episode and locations of previous large events reflects two major spatial features in the seismicity that are repeatedly activated or which mark sharp boundaries to the spatial pattern of clusters and aftershock zones. These features seem clear examples of "asperities" whose rupture may account for the preponderance of moderate activity characteristic of the region. The seismicity of the interplate boundary located down-dip of these features shows a more continuous activity of small magnitude events in contrast to the strongly clustered up-dip seismicity. The larger events in the down-dip zone also produce less populous and more spatially concentrated aftershock zones compared to those in the up-dip zone. These differences may indicate a down-dip increase in the predominance of creep.

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