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Anomalous Effect in Schumann Resonance Phenomena Observed in Japan, Possibly Associated with the Earthquakes in Taiwan

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The Schumann resonance phenomenon has been monitored at Nakatsugawa (near Nagoya) in Japan since the beginning of 1999, and due to the occurance of a severe earthquake (so-called Chi-chi earthquake) on 21 September 1999 in Taiwan we have examined our Schumann resonance data at Nakatsugawa during the entire year of 1999. We have found a very anomalous effect in the Schumann resonance, possibly associated with two large land earthquakes (one is the Chi-chi earthquake and another one' on 2 November 1999 (Chia-yi earthquake) with a magnitude again greater than 6.0). Conspicuous effects are observed for the larger Chi-chi earthquake, so that we summarize the characteristics for this event. The anomaly is characterized mainly by the unusual increase in amplitude of the fourth Schumann resonance mode and a significant frequency shift of its peak frequency (∼1.0 Hz) from the conventional value on the. B, Y magnetic field component which is sensitive to the waves propagating in the NS meridian plane. Anomalous Schumann resonance signals appeared from about one week to a few days before the main shock. Secondly, the goniometric estimation of the arrival angle of the anomalous signal is found to coincide with the Taiwan azimuth (the unresolved dual direction indicates toward South America). Also, the pulsed signals, such as the Q-bursts, were 'simultaneously observed with the