Hydrological earthquake precursors caused by slow-slip events

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Large earthquakes are often preceded or followed by slow-slip events, which when better understood, may help better understand the mechanism of the earthquakes and the possibiliity of their prediction. This paper presents some hydrological changes recorded at some sensitive sites in or near active fault zones before the occurrence of several moderate-to-large earthquaes in Taiwan and Japan. They include a large stream-flow change and a small water-level change recorded before the 1999 magniitude 7.6 Chi-Chi earthquake in central Taiwan, and a large water-level change recorded in a sensitive well at Tono, central Japan, before a magnitude 5.8 local earthquake. Several smaller water-level changes had also been recorded in this well before some large distant earthquakes of magnitude 6.1-8.1 at epicentral distances of 220-1260 km. All these changes can be attributed to the occurrence of some corresponding pre-earthquake slow-slip events.

Keywords: hydrological earthquake precursor, slow-slip event, sensitive sites

