A 70+ station GPS recording of the January, 2007 Cascadia ETS

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To date, 35 slow slip events that have been recognized with GPS in the Cascadia subduction zone. Of these, the coverage of the most recent January 2007 transient is unprecedented and reflects the ongoing geodetic instrumentation of the northern Cascadia forearc. Compared with previous events recorded on a handful of stations, this most recent episodic tremor and slip (ETS) event ruptured through more than 70 instruments from the combined PBO and PANGA arrays: 40 of the instruments recorded measurable deformation. Although at this time final orbits are still pending for last few days of the event, many of the ETS characteristics are already measurable. The event nucleated mid-January to the west of the southern Puget Basin and propagated only northwards: transient deformation appears in the southern Puget Basin for at least 14 days prior to its onset around the Strait of Juan de Fuca. The greatest offsets are also found along a swath beneath the eastern Olympic Mountains and overlying the 30 km depth contour, west of the southern Basin. The largest of these measures $6 \pm 1.8$ mm and is directed towards the southwest, characteristic of previous Cascadia events. The total effective moment of the event appears to be $M_{w}=6.6$, as estimated by inverting transient offsets for thrust-only slip; this number is also typical of past events in this region. Slip appears to be more concentrated, with best-fitting inversions yielding 4 cm of slip. Qualitatively, this event looks similar to the northern half of the February-March 2003 ETS, which also nucleated in the SW Puget Basin but propagated bidirectionally to the north and south. Based on the last decade of GPS data, at this time it looks as though this region is not bleeding off strain energy as fast as it tectonically accumulates, suggesting this region might seismogenically fail during a megathrust event.

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