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A transient in surface motions dominated by deep afterslip subsequent to a shallow supershear earthquake: the 2018 M_w 7.5 Palu case.

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The 2018 M_w 7.5 Palu earthquake is a remarkable strike-slip event due to its nature as a shallow supershear fault rupture across several segments and a destructive tsunami that followed co-seismic deformation. GPS offsets in the wake of the 2018 earthquake display a transient in the surface motions of northwest Sulawesi. A Bayesian approach identifies (predominantly a-seismic) deep afterslip on and below the co-seismic rupture plane as the dominant physical mechanism causing the cumulative, post-seismic, surface displacements whereas viscous relaxation of the lower crust and poro-elastic rebound contribute negligibly. We confirm a correlation between shallow supershear rupture and post-seismic surface transients with afterslip activity in the zone below an inter-seismically locked fault plane where the slip rate tapers from zero to creeping.