

Different directions and rates between the geological and the geodetical vertical deformation in the northeastern Japan arc

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Crustal uplift rates of the central part of the northeastern (NE) Japan forearc are estimated using late Quaternary terrace surfaces. The ages of terrace surfaces are correlated to marine isotope stages (MIS) by tephrochronology and ^{14}C dating. Along the Pacific coast, uplift rate determined from a MIS 5.5 marine terrace surface is estimated to be 0.13 - 0.16 m/ky. At Isawa upland, inland of NE Japan, the latest and older fill terrace surfaces were correlated to MIS 2/1 and MIS 6/5, respectively. The incision rate, estimated as 0.16 m/ky from the relative heights of the fill terrace surfaces, agrees roughly with the uplift rate along the Pacific coast. In contrast, geodetic surveys (leveling surveys) and GPS observations show that subsidence along coastal area and at Isawa upland reaches to -1 mm/yr and -5.5 mm/yr respectively. This short-term subsidence is different direction of the long-term uplift. Furthermore, the short-term subsidence is nearly one order of magnitude larger than the long-term uplift at Isawa upland. Thus forearc subsidence can not be extrapolated to long-term tectonic movements. We interpret short-term geodetic subsidence as elastic deformation of the forearc crust caused by interplate coupling between the Pacific and the Eurasian plates.