



Usability of velocities of GNSS campaign measurements on volcano monitoring depending distance between station and volcano

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GNSS campaign measurements are often used for also volcano monitoring. The most important reason for this is that the permanent stations near the volcano are costly and likely to be damaged after the eruption. Often, even campaign measurements are risky near an active volcano. On the other hand, it would be low risky and low costly to make campaign measurements distant from volcano activities and eruptions. In this study, in order to expound the analysis results, we constituted our global test area using five IGS stations around five active volcano eruptions over 2019 via the Smithsonian Institute Global Volcanism Program. The data archives of the International GNSS service (IGS) and the time series of the Jet Propulsion Laboratory (JPL) were used for the purpose. And then we decimated the continuous data down to monthly and four monthly sampled GPS campaign time series. We also generated random values of ± 3 mm for possible antenna setup errors. We tested whether the velocities obtained from monthly and four monthly solutions differ significantly from the velocities derived from daily solutions. As a result, we concluded on monthly velocities that horizontal components are compatible completely and 80% of the vertical components are compatible. We also concluded on four monthly velocities that 65% of the horizontal components are compatible and vertical components are compatible completely. We explained the utilization of campaign measurements in volcano monitoring by examining the effect of the distance between the stations and volcanoes on the results obtained.

Keywords: Volcano Monitoring, GNSS Campaign Measurements.