

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Application of Seasonal Trend Loess to GPS data in Cascadia AMRIT BAL, NOEL BARTLOW, University of Missouri-Columbia — Plate Boundary Observatory GPS stations provide crucial data for the study of slow slip events and volcanic hazards in the Cascadia region. These GPS stations also record seasonal changes in deformation caused by hydrologic, atmospheric, and other seasonal loading. Removing these signals is necessary for accurately modeling the tectonic sources of deformation. Traditionally, seasonal trends in data been accounted for by fitting and removing sine curves from the data. Yet, not all seasonal trends follow a sinusoidal shape. Seasonal Trend Loess (STL) is a filtering procedure for decomposing a time series into trend, seasonal, and remainder components (Cleveland et. al, Journal of Official Statistics, 1990). STL consists of a sequence of applications of the loess smoother that allows for fast computation of large amounts of trend and seasonal smoothing. STL allows for non-sinusoidal shapes in seasonal deformation signals, and allows for evolution of seasonal signals over time. We applied STL to GPS data from the Cascadia region. We compared our results to a traditional sine wave fit for seasonal removal at selected stations, including those with slow slip events and volcanic signals. We hope the STL method can more accurately differentiate seasonal and tectonic deformation signals.

Amrit Bal
University of Missouri-Columbia

Date submitted: 13 Nov 2016

Electronic form version 1.4