



# Evaluation of Capivara (SP) station orientation using teleseismic events

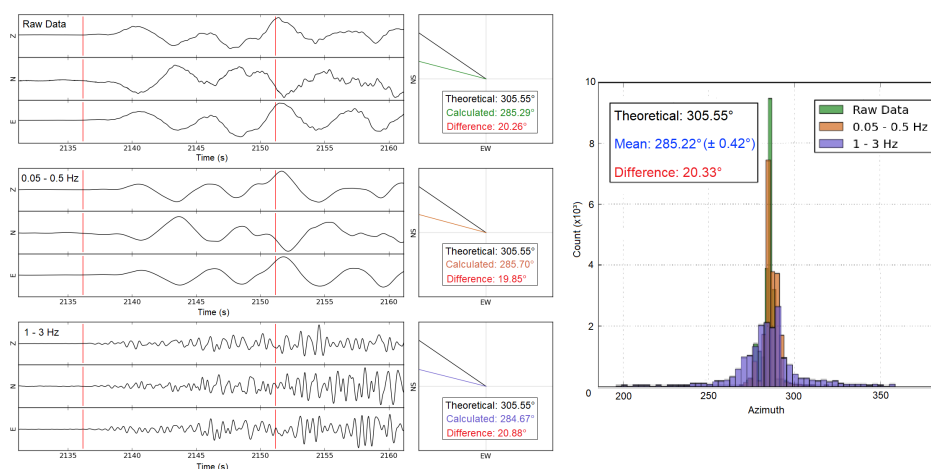
Victor Salles<sup>\*1</sup>, Marcelo B. de Bianchi<sup>1</sup>, and Jesus Berrocal<sup>2</sup>

<sup>1</sup>Universidade de São Paulo (USP)

<sup>2</sup>TerraFísica - Inovações Sismológicas

## Abstract

The correct orientation of a triaxial seismographic station concerning the geographic North Pole is of great importance while recovering the accurate movement of the ground due to the arrival of the seismic waves and after that, calculating an earthquake epicenter location. Poor orientation of the station can occur for several reasons, among them: lack or incorrect magnetic declination of the compass; interference in the compass caused by magnetized rocks at the installation site; inaccuracy when transferring the compass north direction to the instrument pillar; or even caused by problems during the equipment's construction. Earthquakes recorded by the Capivara Seismographic Station in São Paulo are located using the time difference between P and S waves' arrivals (S-P) and their azimuths showed constant divergence in results compared to locations using travel times alone. To ascertain the station orientation, we applied a method of azimuthal estimation based on the polarities of the P waves from well-located teleseismic events. Earthquakes were chosen considering magnitudes greater than or equal to 5.5 and epicentral distances between 30° and 90°. Data were manually inspected and preprocessed to highlight features of interest. Azimuths were obtained by averaging the arctangent values of the North-South by East-West components corrected by the vertical. For each earthquake, three filters were applied in 15 different time windows, allowing the determination of uncertainty. Results indicate that the station's North-South component is oriented at the azimuth  $339.04^\circ \pm 2.96^\circ$ . Considering this new orientation, epicenters previously located using the azimuth and S-P time could be corrected, and significant earthquakes detected by the CAP12 station could be correctly located, such as the Curitiba earthquake (September 2017) which had its final epicenter determined at a distance of 33km from the epicenter determined by the Brazilian Seismographic Network.



\*Presenting Author.