2. Phase Tensor Applied to Geothermal Fluid Reinjection Monitoring

- Repeat MT measurements were made in 2010, 2011, and 2012 prior to planned 2013 reinjection of spent geothermal fluids at the southern margin of the Wairakei geothermal field in New Zealand.
- The study applies feature 1. above that phase tensor remains unchanged despite variable noise or surficial changes.

3. Phase Tensor Applied to Geothermal Modeling (Inversion)

- Figures 9 and 10. Using MT sounding data for periods up to ~10 s period isolates 1-D/2-D shallower sections and allows non 3-D modeling. Comparison of tensor ellipses with polar diagrams for an undistorted sounding (Figure 9) and a distorted one (Figure 10) confirms that the phase tensor identifies 1-D in both cases (i.e., circular ellipses), whereas, polar diagrams do not. Phase tensors clearly identified the basement 2-D geoelectric strike. Prior to MT inversions, static offsets were corrected by using: 1) the known geoelectric section above the water table from well logs and dc resistivity soundings and 2) its elevation.

4. Conclusions

- MT phase tensor analysis has unique applications in repeat monitoring of fluid injection and dimensionally, directivity analysis prior to inversion modeling. For example, dimensional analysis can reveal if a deeper section, responsible for 3-D structure, can be removed thus allowing valid, shallower, 1-D/2-D inversion.