JOINT INTERPRETATION OF MAGNETOTELLURIC AND GRAVIMETRIC DATA IN THE PARANÁ BASIN

EDGAR B. SANTOS[1] (edgarbueno.santos@gmail.com), HENRIQUE B. SANTOS[2] , ÍCARO VITORELLO[3] & MARCELO B. PÁDUA[3]

[1] Institute of Physics, University of São Paulo; [2] Department of Petroleum Engineering, University of Campinas
[3] Space Geophysics Division, National Institute for Space Research (INPE)

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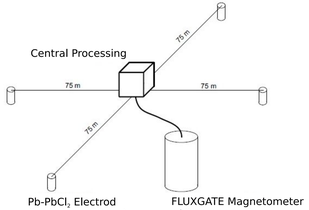
MT DATA ACQUISITION



A MT survey consists in the measurement of variations of orthogonal components of the electric field (E_X e E_Y) and magnetic field (H_X, H_Y e H_Z) in the Earth's surface.

IMPEDANCE TENSOR

For an anisotropic or a laterally inhomogeneous earth model, the relation between the electric and magnetic fields is given by the impedance tensor:

$$\begin{bmatrix} E_x \\ E_y \end{bmatrix} = \begin{bmatrix} Z_{xx} & Z_{xy} \\ Z_{yx} & Z_{yy} \end{bmatrix} \begin{bmatrix} H_x \\ H_y \end{bmatrix}$$

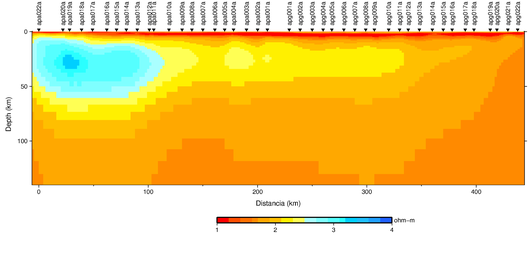
Thus it is possible to calculate the apparent resistivity (ρ_a) and phase (ϕ) as

$$\rho_{a,ij}(\omega) = \frac{1}{\mu_0 \omega} |Z_{ij}(\omega)|^2$$

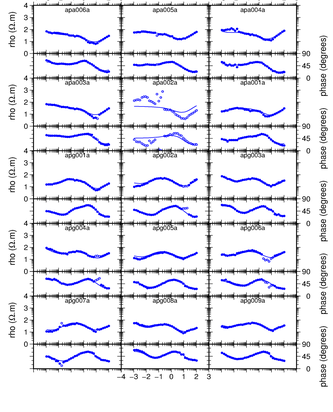
$$\phi_{ij} = \tan^{-1}\left(\frac{\Im(Z_{ij})}{\Re(Z_{ij})}\right)$$

where μ_0 is the magnetic permeability in the free-space and ω is the angular frequency. To calculate the impedance tensor we used a robust algorithm developed by Gary Egbert (Egbert and Booker, 1986).

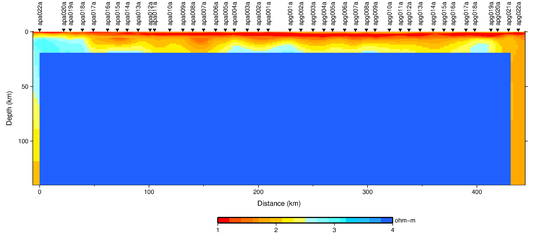
2D INVERSION FOR THE TRANSVERSE MAGNETIC MODE



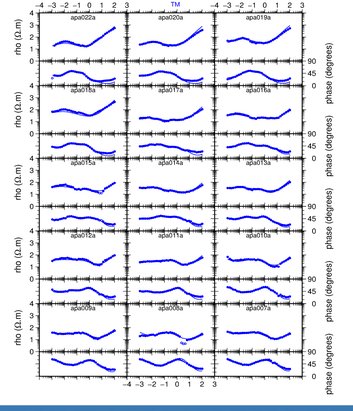
2-D inversion resistivity model using REBOCC, Reduced Basis OCCAM algorithm,proposed by Siripunvaraporn and Egbert (2000). The RMS resistivity for this model is 1.27.



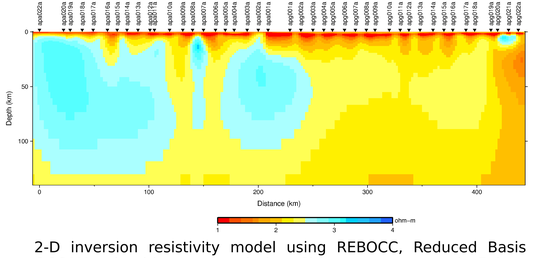
SENSITIVITY OF THE TRANSVERSE MAGNETIC MODE



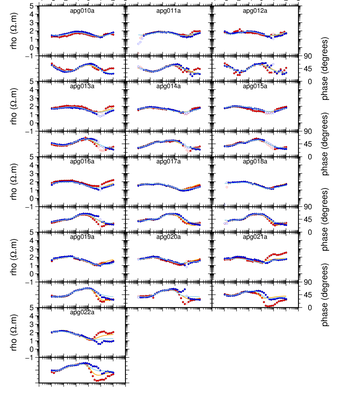
2-D inversion resistivity model using REBOCC, Reduced Basis OCCAM algorithm,proposed by Siripunvaraporn and Egbert (2000). The RMS resistivity for this model is 1.98.



2D INVERSION FOR THE TRANSVERSE AND ELECTRIC MODE



2-D inversion resistivity model using REBOCC, Reduced Basis OCCAM algorithm,proposed by Siripunvaraporn and Egbert (2000). The RMS resistivity for this model is 2.47.



CONCLUSIONS

- A gravimetric feature almost parallel and near the Paraná River indicates the presence of an anomalous deep body.
- We have presented a 2-D geoelectric model of the deep structure in the Paraná Basin.
- Presence of a high conductivity band in the upper part, that represents the sedimentary basin.
- High resistivity body below the area of the basin.
- Our model may help to understand the geological structure of the Paraná Basin.

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