

Contribution Of Borehole, Gravity And Electrical Data In The Study of the Geological Structures of the Gantour Deposits (Benguerir, Morocco)

Anas Charbaoui^(1), Azzouz Kchikach^(1,2), Mohammed Jaffal^(1,2), Jean Louis Bodinier^(1,3), Bouazzaoui Eljabbar⁽¹⁾, Oussama Khadiri Yazami⁽⁴⁾, Mourad Guernouche⁽⁴⁾, Es-Saïd Jourani⁽⁴⁾*

⁽¹⁾Mohammed VI Polytechnic University, Geology and Sustainable Mining (GSM), Benguerir, Morocco

⁽²⁾Cadi Ayyad University, Georessources, Geoenvironment & Civil Engineering Laboratory, Marrakech, Morocco

⁽³⁾University of Montpellier & CNRS, Geosciences Montpellier, Montpellier, France.

⁽⁴⁾OCP Group, Casablanca, Morocco

*Email: anas.charbaoui@um6p.ma

Summary

Subsurface imaging is an efficient tool of basins study at different scales. The integration of subsurface and surface geological information has clear implications for geological modeling and resource exploration. For that purpose, sedimentary basins are generally investigated using indirect approach based on geophysical methods or direct recognition by boreholes and surface geological observations. These investigations help acquire a variety of geoscientific data that can be used in the conception of geological models. This work is based on the joint analysis of this kind of data. It is concerned with the study of the Bahira basin that hosts, with the Gantour plateau, an important part of Morocco's phosphate reserves.

The eastern Bahira basin has been the subject of numerous geophysical surveys among which the most known are the regional gravity and vertical electrical sounding (VES) coverage. The gravity survey was conducted by the Moroccan Ministry of Energy and Mines for mineral exploration purpose. However, the VES survey was carried out by the Tensift Basin Hydraulic Agency within the framework of hydrogeological investigation project.

The present study represents the first step of our thesis project. It is concerned with the compilation of geophysical and geological information about the eastern Bahira basin through the analysis and the interpretation of the available data. Its main objective is to provide a good knowledge of the geology of this basin.

The processing and interpretation of gravity data was performed using contacts analysis methods based on filtering techniques including Total Horizontal Gradient and Upward continuation. This helps detect major geological structures such as faults and geological contacts which are totally or partially covered by plio-quadernary deposits. In addition, the gravity anomalies perfectly delineated the basement structural highs as well as the sedimentary thickening in depressions and grabens. Furthermore, the analysis of VES and borehole data provide precisions about deep structure of the phosphatic series of the eastern Bahira basin in terms of deepening and thickness lateral change.

Keywords: Phosphatic series, gravity prospecting, Electrical Resistivity Tomography, Bahira basin, Morocco.