

DETAILED GEOPHYSICAL INVESTIGATIONS OF STABLE AND UNSTABLE SECTIONS OF SARKIN PAWA-MANGORO ROAD, NIGER STATE, NIGERIA

JATTO S. S.¹, SULE P. O.², AHMED A. L.³, OHAKWERE-EZE M. C.⁴ & OBIHAN I.⁵

¹Centre for Atmospheric Research, Anyigba

^{2,3}Department of Physics, Ahmadu Bello University, Zaria, Nigeria

^{4,5}Department of Earth Sciences, Salem University, Lokoja

ABSTRACT

Geophysical investigations involving the Schlumberger vertical electrical sounding (VES) and the magnetic method have been carried out along stable and unstable sections of the Sarkin Pawa-Mangoro road in Niger State, Nigeria. This is to investigate the factors responsible for the incessant pavement failure within the area. A profile with a total of 28 VES stations at a separation of 50 metres covering a distance of 1350 metres was established parallel to the road pavement on each side of the road. ABEM SAS 300 terrameter was used for the measurements. The magnetic survey was conducted using the Proton Magnetometer at a station interval of 25 metres along two profiles on each side of the road and running parallel to the road pavement. The profile separation was 7 metres. The two innermost profiles are on the same VES profiles above. The geoelectric sections along the stable segments of the road show generally resistive subsurface, while the magnetic profiles show a homogeneous subsurface devoid of geological features. Beneath the unstable segments, the geoelectric sections show low resistivity clay topsoil, water absorbing substratum, and near-surface water table. The magnetic profiles indicate a prominent low magnetic linear feature which is suspected to be a fault within the basement, or an old stream channel which has been covered with sand. This magnetic feature corresponds to a visible subsidence on the earth's surface. The unstable sections, which correspond to pavement failure, can hence be delineated using geophysical investigations and thus enabling necessary remedial actions to be taken when constructing the road.

KEYWORDS: Vertical Electrical Sounding, Magnetism, Mangoro, Geoelectric Section, Resistivity, Pavement Failure