

# ABOUT THE CONFIGURATION OF THE GEOID UNDULATIONS AND THEIR KINEMATICS

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**ABSTRACT.** The paper aims to underline the continuity of the geoid undulation positions of same frequency, on the terrestrial surface, which are the result of some possible movements in ratio with Earth rotation. In order to reach this theory, one must carry out the configuration of the geoid undulations in parallel sections, after which it is used the animation method. The results demonstrate the following: the continuity of the same frequency undulations; kinematic vectors that are parallel with the rotation movement; an advance of equatorial section's undulation.

## 1. METHOD

Creating the undulations configuration in some sections, at the same scale, resulting in specific figures. Kinematic running (animation) of these figures.

## 2. RESULTS

By kinematic unfolding of the undulation's configuration is found that: - there is a continuity of the same frequency undulations from a parallel to another; - there are kinematic vectors in two directions: a) in east-west direction; b) in north-south direction in the Boreal Hemisphere and in south-north direction in the Southern Hemisphere; - there is an advance of the same frequency undulations in equatorial section, in progressively relation with the undulations placed in the parallels sections. The size and the orientation of the arrows demonstrate the trend of the undulation configuration from the sections of the latitudes in relation to the undulation configuration from the equator's section (Fig. 7). This trend is much more visible, using the animation method.

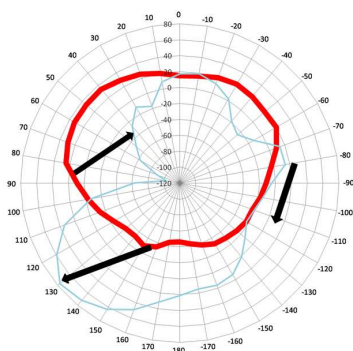


Fig. 1. Section 60° S - Latitude

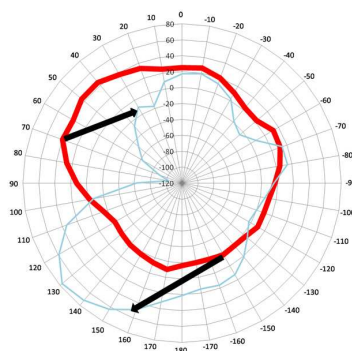


Fig. 2. Section 50° S - Latitude

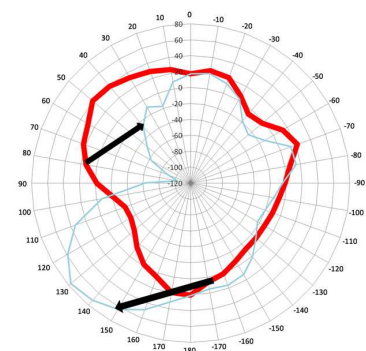


Fig. 3. Section 40° S - Latitude

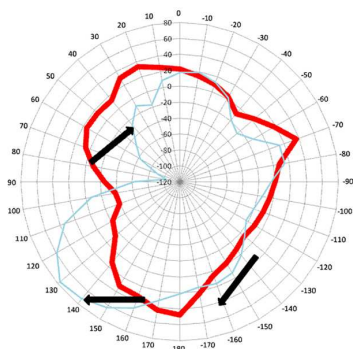


Fig. 4. Section 30° S - Latitude

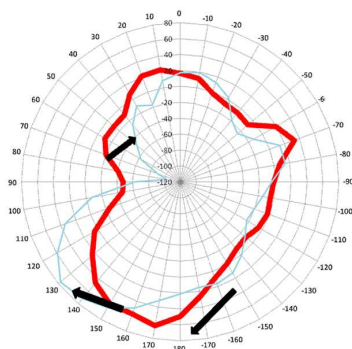


Fig. 5. Section 20° S - Latitude

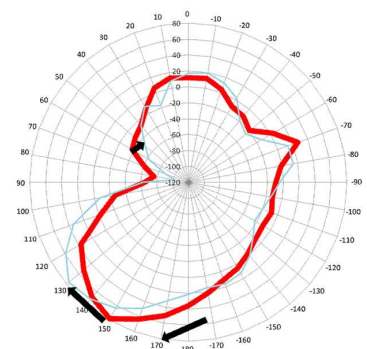


Fig. 6. Section 10° S – Latitude

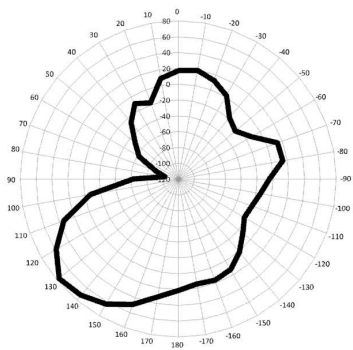


Fig. 7. Section 0° - Latitude

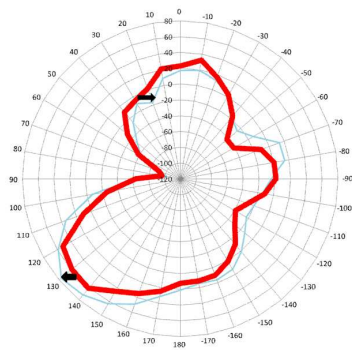


Fig. 8. Section 10° N - Latitude

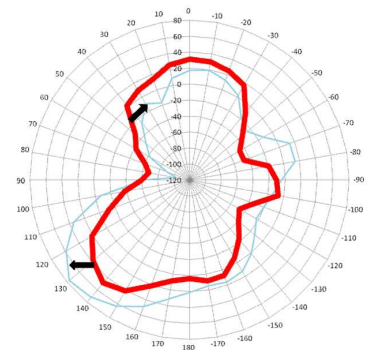


Fig. 9. Section 20° N – Latitude

### 3. CONCLUSIONS

- Using the undulations animation globally highlights the Coriolis effect, emphasizing possible progressive stages in undulation's translation from west to east and from the equator to the poles.

- If the apparent path of the undulations in some directions, can be explained as a product of continental drift, there may be clarifications, for the principle of the terrestrial reference frame, no net rotation (NNR) with regard to the Earth's lithosphere.

### 4. REFERENCES

NGA : (U) NGA EGM Geoid Calculator (UNCLASSIFIED), 11 Apr 2008 NGA : (U) WGS 84 Earth Gravitational Model 96 (EGM 96) Metadata, released by the Federal Geographic Data Committee, June 8, 1994. Science Product Support - Geoid Height Calculator, UNAVCO Facility, 2 Mar 2009.