8 Novembre - Matin -

Séance présidée par W. RYAN.

8-1. - MAGNETOTELLURIC MEASUREMENTS IN THE NORTHERN PART OF THE ALPS

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During the last years (mainly 1972) the time varying magnetic and electric field has been measured between the northern boundary of the alps (Chiemsee) and the Drau valley. We have measured the time varying electric field of the earth at 25 sites and the time varying magnetic field of the earth at 8 sites. The measuring period at each site lasted from 4 days up to six weeks. From such simultaneous registrations of the time varying electric and magnetic field of the earth the specific electric conductivity in the interiour of the earth can be determined. Knowing the average electric conductivity of the rocks near the surface, one can give some informations about deeper situated structures.

In the area of the transition zone molasse trough/calcareous alps we are interested in the depth and morphology of the surface of the cristalline basement and in the conductivity of the rocks between the cristalline and the outcropping calcareous alps. It is important to know if there are molasse sediments of a larger thickness beneath the calcareous alps. As a first result we found, that about 10 km south of the morphologic boundary of the alps the conductivity-depth distribution is still similar to that in the southern part of the molasse trough (where well conducting sediments with a thickness of about 5 km exist). At the measuring sites, which are more than 10 km south of the morphologic boundary of the alps, the electric conductivity in the uppermost km is smaller than it is near the boundary of the alps. So we assume, that well conducting sediments with a similar thickness as in the central part of the molasse trough exist till about 10 km south of the morphologic boundary of the alps.

On the other hand we are interested in deper situated structures in the central part of the alps, where in a depth of some kilometers a decrease of the density and the velocity of seismic waves have been found. If this density and velocity-inversion would be caused by the increasing temperature beneath the central alps, then a higher electric conductivity should be expected. If, on the other hand, the diminished density and wave velocity are caused by a variation of the chemical composition of the rocks, we would not expect an increased electric conductivity. Until now we have measured the time varying electric and magnetic field in the central alps only at some sites in the Salzach valley near Mittersill, near the Felbertauern-Tunnel and in the Drau valley. From these results the electric conductivity seems to increase from Pass Thurn to the south in a depth not yet calculated.

The depth of the increasing electric conductivity cannot be situated near to the surface. The central part of this area with higher conductivity is assumed to be south of the highest part of the Tauern moutains. In the average the area with increased conductivity should strike about EW.

Interventions 8-1.

CANITEZ Nezihi -
1 - Did you use any digital filter before processing electrical and magnetic data ?
2 - Why don't you measure the electrical field in two directions perpendicular to each other ?

Reply :
1 - Nous n'avons pas de filtre digital.
2 - En Magneto-tellurique vous adoptez une direction préférentielle. Ce n'est pas une courbe NS mais selon une direction préférentielle chaque fois. Dans le sens perpendiculaire les amplitudes sont très faibles.

BYRAMJEE R. - The interpretation of magneto-telluric is difficult and needs the help of either preconceived ideas or very good geological knowledge of the surrounding area.

Reply : Nous avons essayé de combiner la sismique, la géologie et les sondages géo-magnétiques. L'incertitude de la magneto-tellurique n'est pas plus grande que celle des autres méthodes. Si l'on peut établir des calculs sur des modèles, comme dans la Vallée du Rhin ou pour les dômes de sel du Nord de l'Allemagne, on a de très bons résultats en traitant les données à l'ordinateur.