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The Largest in the World Conductive Zones as Indicators of the Earth's Crust Structure and Evolution.

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An important result of electromagnetic soundings has been the discovery of the sharp electrical heterogeneity of the Earth's crust. Extended zones and belts of high electrical conductivity have been found in different continents of the world (Fig. 1). According to formal (one-dimensional) interpretation the anomalies occur as the so-called "intermediate conductive layers" at the depth from units to the first dozens of kilometers. Their influence substantially limits the possibilities of studying more deep horizons of the lithosphere. Crustal conductors are of special interest for fundamental and applied geology. They are indicators of physical state, evolution and geodynamic development of corresponding blocks of the Earth. The nature of electrical anomalies is of special interest for interpretation of the deep soundings data. Currently, for to solve this problem, two principal concepts are being developed: the fluid and the electronic ones. Our results are more consistent with the idea of their connection with graphite and sulfide bearing electron conducting structures that have primary biogenic, sedimentary origin. According to this concept, at an early stage of the Earth's evolution, the character of geological processes changed dramatically in connection with the appearance of the atmosphere, hydrosphere and photosynthetic bacteria. Since then (3.0–3.5 Ga), the organic life appeared and started to develop actively. It proceeded most intensively in shallow water basins, where the organic matter accumulated and was buried. Simultaneously, these regions sank and were subject to disjunctive tectonic movements, erosion and sedimentation. The deep metamorphism resulted in elimination of volatiles and in structural

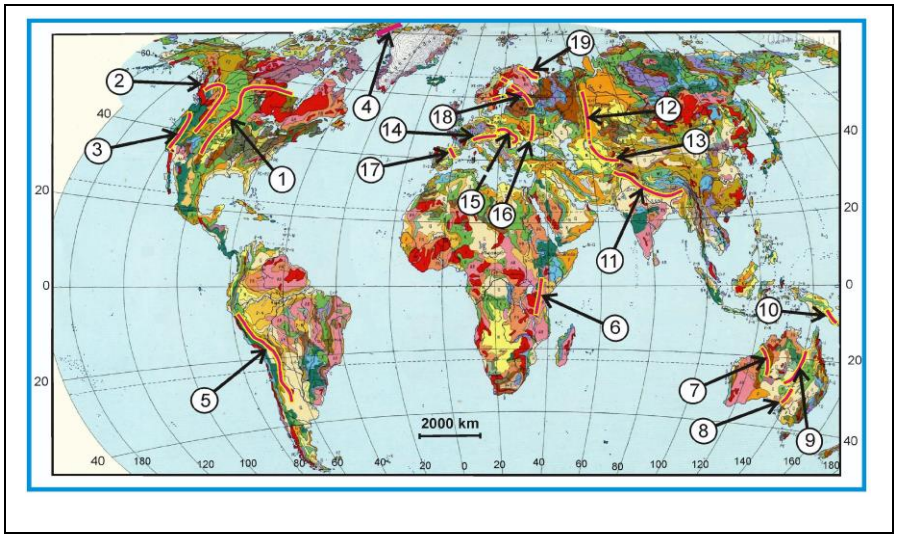

Figure 1. The largest in the World conductive zones (red lines).

1 - North-American; 2 - Bitterrut-Cascade mountains; 3 - Sierra-Nevada; 4 - North-Greenland; 5 - Andian; 6 - Kenya, 7 - Karpentary; 8 - Flinders; 9 - South-West Kvinslend; 10 - New Guinea; 11 - Himalaya; 12 - Urals; 13 - South-Tien-Shan; 14 - Alpine-Pannonian; 15 - Carpathian; 16 - Kirovogradsky; 17 - Pyrenean 18 - Ladoga-Bothnian; 19 – Pasvik-Pechenga-Imandra-Varzuga

rearrangement of substance. Fossils, rich in hydrogen and iron, were transformed into peculiar interlayered members of electronically conductive sulfide-graphitic rocks. The zone was called a suprastructure, or a zone occurring on the primary crust at the earliest nuclear stage of the Earth's development. These anomalies include gigantic conductive inclusions, or cover formations. We have defined this area as sulfide-carbon layer ("SC-layer" by Semenov). "SC-layer" is sometimes observed in the form of faults, overthrusts, subduction zones or rift structures. The most intensive geological processes and the majority of mineral deposits are found around these conductive zones.