

# FIRST BREAK



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# Geotech Seismic Services launches MER nodal recording system

Geotech Seismic Services (GSS) in Russia is launching an innovative molecular electronic receiver (MER) nodal recording system to replace standard electromagnetic geophones.

The 'Otkrytie' (Discovery) system, built by the Russian geophysical equipment manufacturer SKB SP, differs from other cableless recording systems due to the built-in molecular-electronic receiver (MER) with high sensitivity (250 V/(m/s)), a broad frequency band (1 to 300 Hz), and low instrument noise, said GSS.

MER receivers have no moving mechanical parts. Instead, oscillations in the ground act on highly conductive working liquid filling a dielectric channel bounded by flexible membranes. The flow of liquid is converted into an electric current. Variations in the current between the electrodes of the sensing element forms the output signal of the MER. This signal

can be proportional to the velocity or the acceleration of the ground oscillations due to the built-in electronics, so the MER can act as a velocimeter or accelerometer.

'The main drawback of MER is its high energy consumption which has so far prevented its use in autonomous cableless systems. But the joint efforts of the geoscientists of GSS and the engineers of R-sensors have made it possible to adapt the design of MER and reduce its power consumption to an acceptable level,' said GSS.

A field trial was conducted in March in temperatures ranging from -21 degrees C by night to +1 degrees C by day. The exploration area was mostly covered by dense forest.

Vladimir Tolkachev, the president of GSS, said that the field trial confirmed the reliability and stability of the 'Otkrytie' nodal system in winter conditions, the

sensitivity of the MER, the performance of the internal batteries and the mechanical rigidity of the nodes.

The trial compared the seismic data recorded by MER and those by standard geophones planted in the same receiver lines, with nodes planted along three receiver lines acquiring data over 10 days. The quality of preliminary time sections was comparable to the results obtained with a standard cable-based recording system, but the fold of coverage was more than ten times higher in the latter case. Detailed analysis of the amplitude spectra has found that the data recorded by the 'Otkrytie' cableless system is characterized by a wider signal spectrum both in low-frequency and high-frequency bands.

GSS is manufacturing several thousand nodes for 3D operations during the winter season.