

APPROACHING 10 MICROSEC (AND EARLIER) WITH THE SKYTEM SYSTEM

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In many applications the resolution of near surface geological layers are of great importance. A number of groundbased transient electromagnetic systems (TEM) provide sufficient early time data enabling such a resolution whereas this has not been possible with airborne TEM systems. Until now.

In this abstract we describe the latest development of the SkyTEM system where early time data from as early as 8 microseconds (from begin of ramp) can be used even with a 500 m² transmitter frame and a maximum magnetic moment of approx. 160,000 Am². The system itself provides unbiased data from around 14 microseconds, but because the bias response at earlier times is 1) dependent of the transmitter coil geometry only, 2) it is constant from flight to flight and 3) it can be estimated from high altitude measurements, the amplitude of the bias response can be determined during the inversion process and thereby modeled.

Using the Laterally Constrained Inversion algorithm to correlate the amplitude from sounding to sounding we show that data from as early as 8 microseconds from begin of ramp can be included in the inversion process. The inverted sections have been successfully validated against ERT measurements on the ground and 6 boreholes to a depth of 25 meters with both geological descriptions, resistivity logs and gamma logs.

In the larger perspective the method can be used to accurately estimate near surface layers thus avoiding expensive and logistically challenging groundbased geophysical campaigns.