

Technology Developments for Geophysical Exploration

- Ground TEM System "SQUITEM"

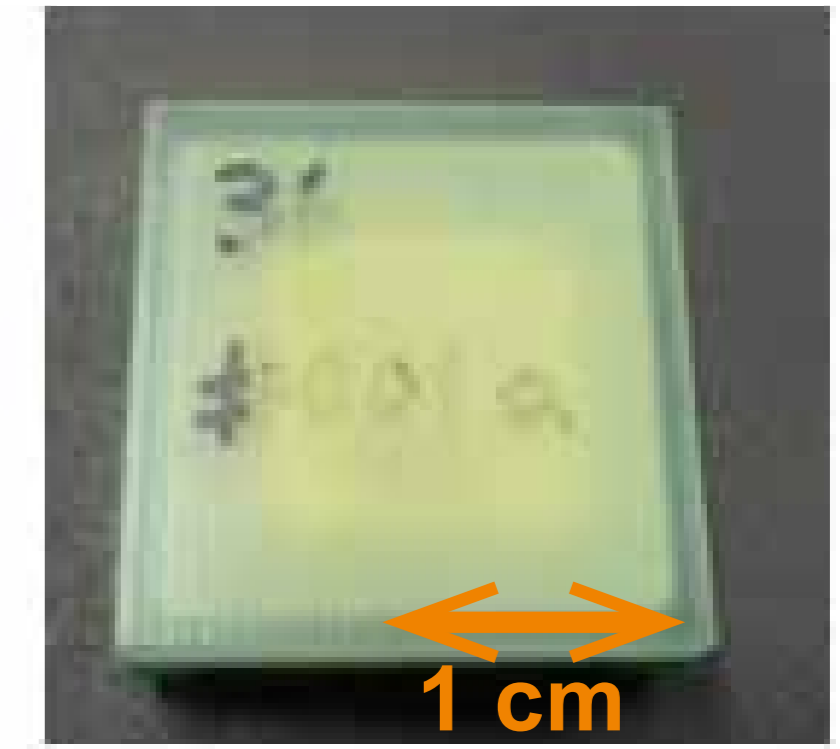
SQUITEM – HT-SQUID Sensor TEM System

"SQUITEM" is the TEM (Transient Electro Magnetics) system using the HT SQUID (High Temperature Superconductive QUantum Interface Device) magnetometers.

JOGMEC has researched and developed the HT SQUID sensors with high accuracy to improve the detectability of the deep underground structure. The conventional TEM data acquisition system obtains the time rate of the magnetic field (dB/dt) which causes an inherent weakness of the conventional system, lower sensitivity for conductive targets and smaller depth of investigation than the direct magnetic field measurement. HT SQUID is a high-sensitive magnetic sensor that measures the B field directly, and has wide bandwidth enough for metal exploration. Therefore, JOGMEC applied the HTS SQUID to TEM as a magnetometer.



All components of SQUITEM 3



SQUID chip

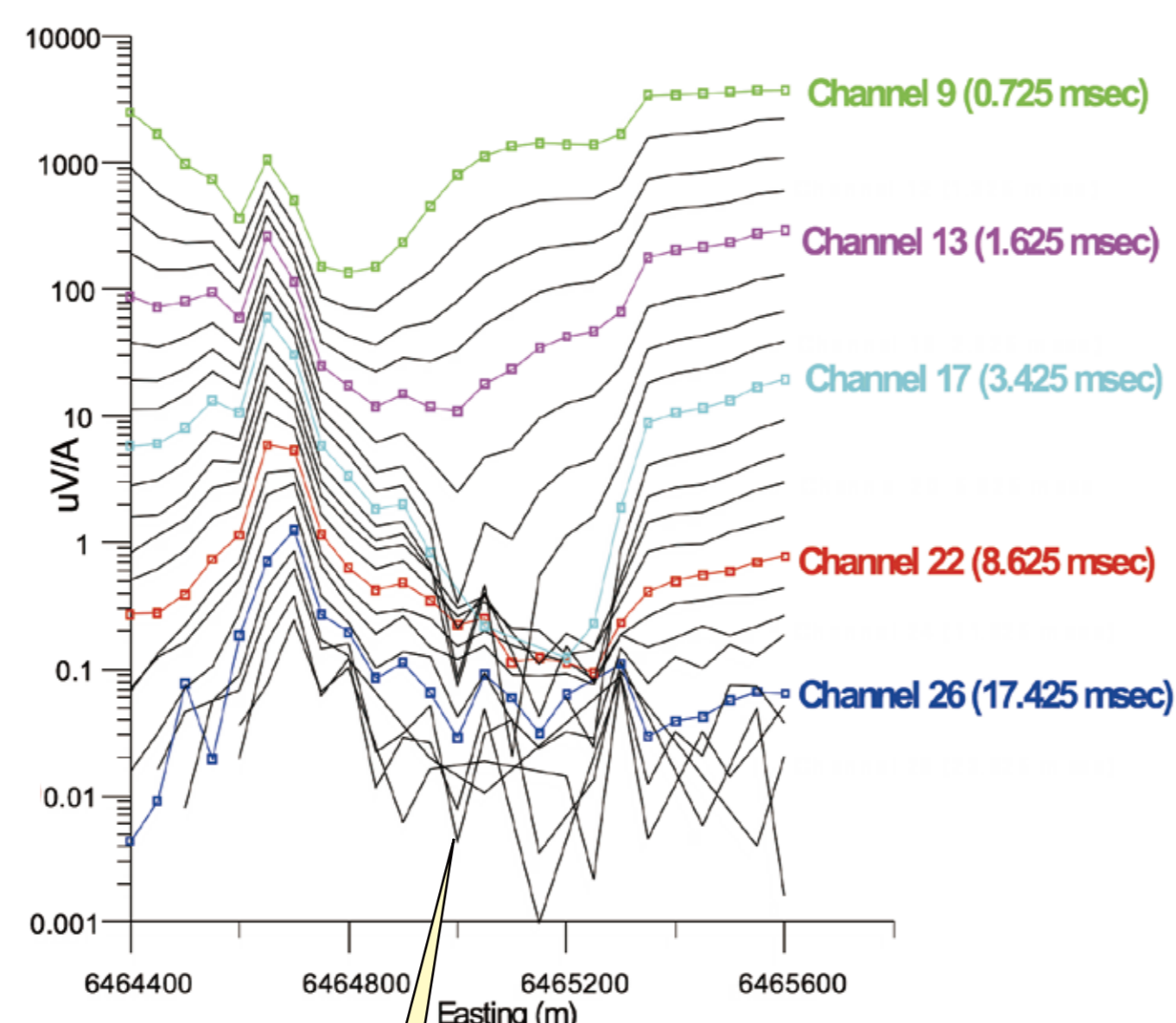
Bandwidth	DC ~ 100 kHz
Field sensitivity	< 30 fT/√Hz @ 1 kHz (field)
Slew rate	> 37.5 mT/sec
Time sampling rate	10 micro-sec
Measured component	Vertical B field
Available transmitter	Geonics / Zonge
Total weight	13 kg
Synchronization	Cable or GPS clock

Deeper Penetration Ability

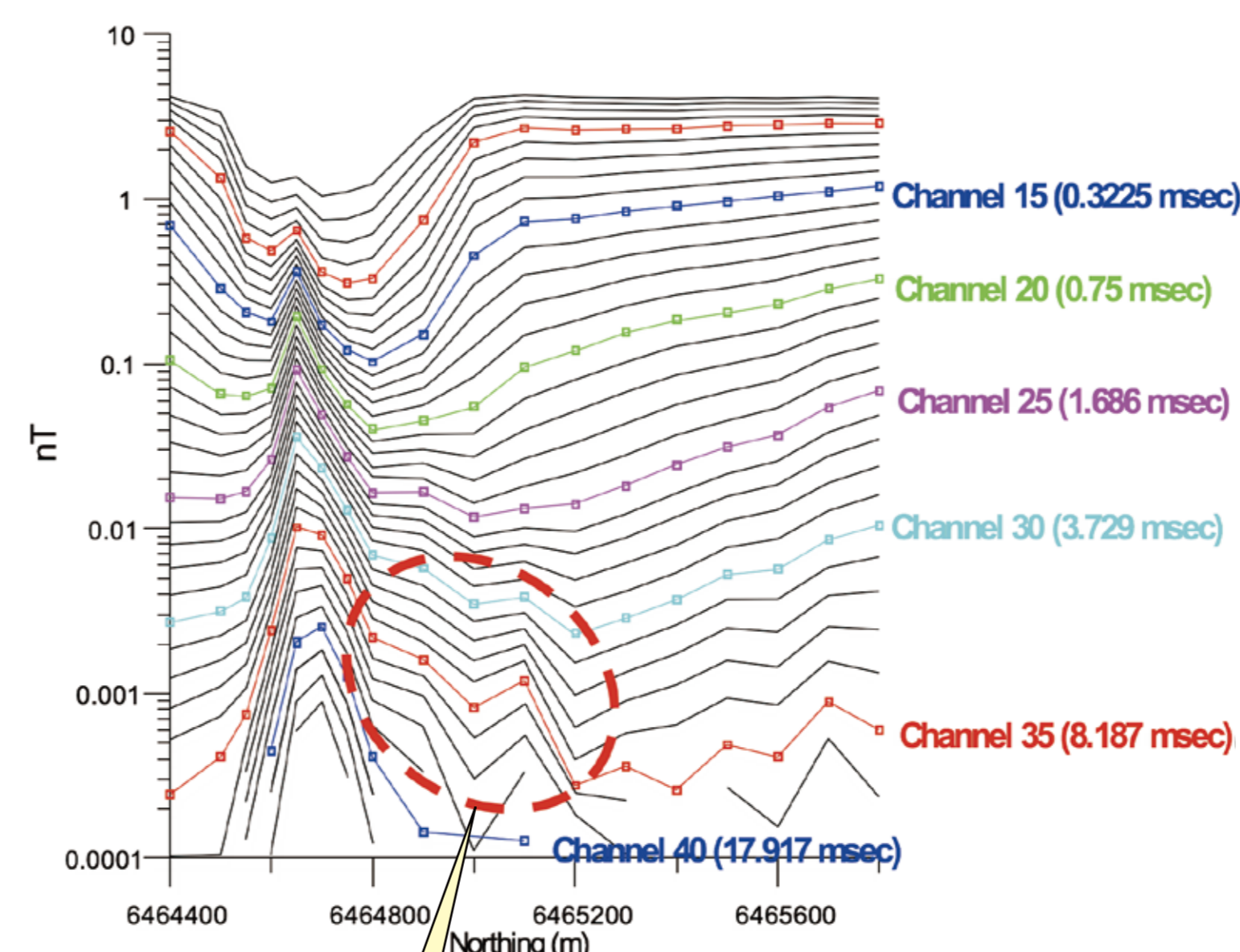
The SQUITEM data profile indicates good quality even at the later time (shown in a red circle) when the conventional coil shows disturbance, which proves the SQUITEM's superiority to the conventional TEM system with respect to depth of investigation. Drilling to this low resistivity resulted in plenty of sulphide.



Induction coil (db/dt)



Disturbance of the late time data compared with SQUITEM data



Higher quality compared with the coil data



SQUID (b-field)

Applied Projects

SQUITEM already applied to more than 10 exploration projects all over the world

