IRIS INSTRUMENTS

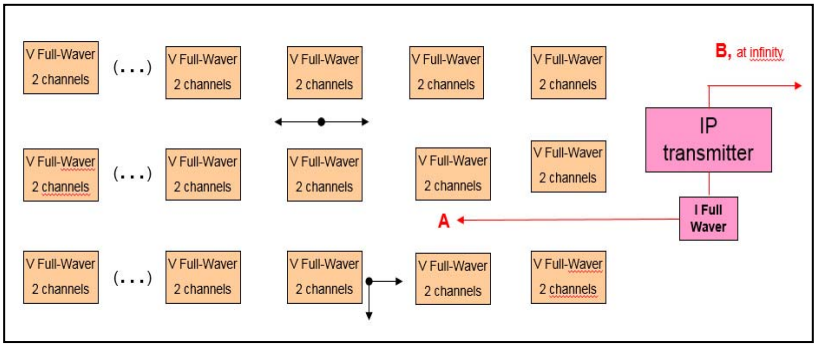
TIME DOMAIN INDUCED POLARISATION SYSTEMS

Full-Waver

DISTRIBUTED SYSTEM FOR RESISTIVITY & INDUCED POLARISATION 3D SURVEYS in Deep Mineral Exploration

The FULL-WAVER distributed IP system concept:

- **A set of receiving nodes (typ. 15 to 50 V-Full-Wavers) are placed in the field,** each one measuring two orthogonal components of the electric field. They record during the whole day time stamped raw data, GPS synchronized. There are no cables between nodes.
- **The current electrodes are moved inside and outside the receiving nodes set up**, with any type of electrode array configuration (pole, dipole, gradient, …), in any direction with respect to the receiving nodes.
- **An I-Full-Waver unit connected in series with the transmitter,** also records during the whole day time stamped samples of the current transmitted (A,B), GPS synchronized.
- **At the end of the day, time series data are downloaded** from the V & I-Full-Wavers to USB stick for further processing on PC.
- **The Full Wave Viewer PC software makes files** where I and V time series are merged for each set of A, B, M, N electrode positions before processing the signals and reducing noise effects.
- **Processed data are sent to a 3D resistivity / IP inversion software (ERTLab)** for a high resolution interpretation thanks to the many receiver nodes locations and many current electrode positions.



V & I-Full-Waver units, tested in the field with VIP 4000 transmitter

GEOMETRY FREE ARRAYS:
no cable between receivers, no fix or preset positions of electrodes to respect

FULL WAVEFORM RECORDING:
post processing of raw data available for improving signal / noise ratio

HIGH RESOLUTION DATA:
several directions of the transmitting line give real 3D data which can be interpreted with 3D resistivity / IP inversion software

SAVING ACQUISITION TIME: quick set up in the field, no movement of receiver nodes for many positions of the current electrodes

EASILY EXPANDABLE SYSTEM:
more V-Full-Waver nodes permit to cover larger areas and /or increase resolution, no wire between nodes

REMOTE REFERENCE CAPABILITY:
using a remote V-Full-Waver unit

V-FULL-Waver SPECIFICATIONS:

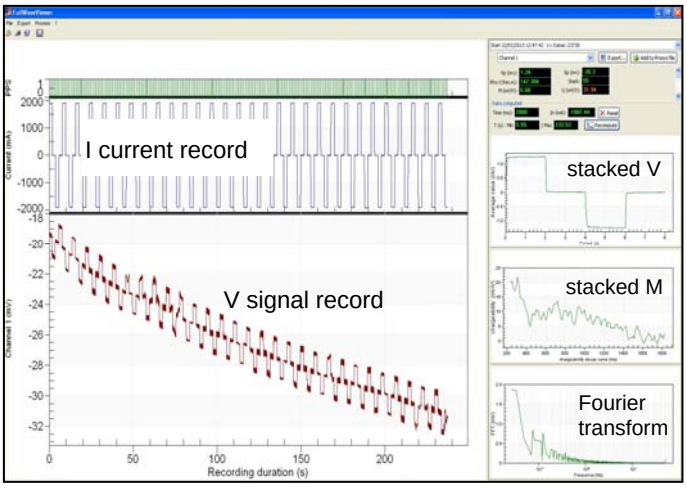
- **Two channel signal (voltage) recorder**
- Input range: +/- 15 V
- Continuous graphic display of voltage waveform for signal control
- Raw data storage in internal memory
- Several weeks data storage autonomy
- USB port for high speed data download
- Sampling rate: 10 ms
- GPS synchronization
- Internal & external battery

I-FULL-Waver SPECIFICATIONS:

- **One channel current recorder**
- Input range: +/- 25 A
- Continuous display of the value of the current
- Raw data storage in internal memory
- Several weeks data storage autonomy
- USB port for high speed data download
- Sampling rate: 10ms
- GPS synchronization
- Internal & external battery

IRIS instruments

Full-Wave Viewer Processing Software



DATA MANAGEMENT:

- **import** (V, time) files from V-Full-Waver USB sticks and (I, time) files from I-Full-Waver USB stick
- **merge** these files into (I, V, time) raw data files
- after processing, **export** the data to PROSYS program for Resistivity & Chargeability quality control and to 3D inversion program (ERTLab)

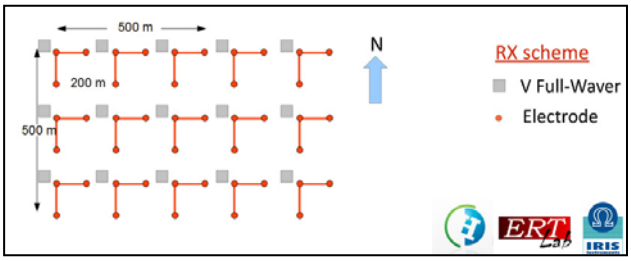
DATA PROCESSING:

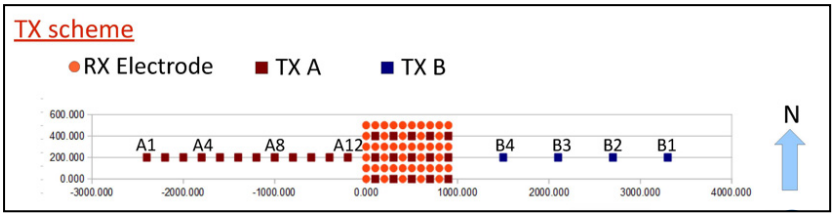
- **displaying I and V** raw data curves on PC screen
- **averaging** on selected low noise periods of time
- **cancelling** SP jumps
- **rejecting spikes**
- **re-synchronizing** the V signals, if necessary
- **computing** Fourier Transform for frequency content analysis

Full-Waver Field Survey

Test site in Shandong Province, China

- Institute of Mineral Resources, Beijing, with cooperation of Hengda, Geostudi, IRIS Instruments
- VIP 10 000 transmitter (10 kW, 3 000 V, 20 A)
- 15 Full-Waver nodes, 30 dipoles, MN = 200 m
- Pole-dipole, Wenner, gradient arrays
- 30 (A,B) injections, AB max = 6 km
- 900 data points with resistivity and IP chargeability
- investigation depth greater than 500 m.

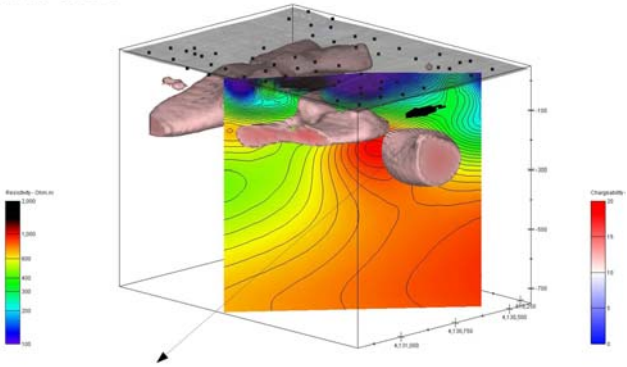




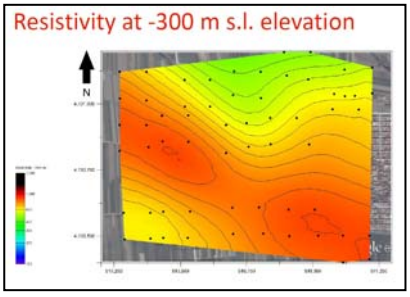
DATA PROCESSING

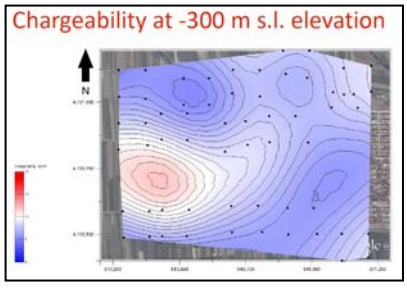
Chargeability volumes > 10 mV/V

NW view



High chargeabilities overlap high/low resistivity interface





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