

*Committee of Geo-Electromagnetics,  
Chinese Geophysical Society*



*KLETOR, Yangtze University*



# 8<sup>th</sup> China International Geo-Electromagnetic Workshop Second Announcement



Yangtze University  
Jingzhou, Hubei, China  
Oct. 11-14, 2007

# 8<sup>th</sup> China International Geo-Electromagnetic Workshop

## Second announcement

The *8th China International Geo-Electromagnetic Workshop (CIGEW)*, conducted by Committee of Geo-Electromagnetics, Chinese Geophysical Society is to be hold during Oct. 11-14, 2007 in Yangtze University, Jingzhou, Hubei, China.

### Main Session Topics

1. New methods, technologies and instrumentation
2. Petrophysical experiments and studies
3. EM data processing, modeling, inversion and imaging
4. Geo-Electromagnetic studies on upper mantle structures and geo-dynamics
5. EM methods for monitoring and forecasting of earthquake, volcano and geological hazards
6. EM methods for resource exploration
7. EM methods for engineering and environment studies
8. EM wave propagation and aero-electromagnetic studies
9. Marine EM
10. Others

### Abstract Format

1. Extended Abstracts should be two to four pages in length including figures. Format model can be found in attached Typographical Instructions.
2. Extended Abstracts should submit to the Organizing Office by email before August 15, 2007.
3. The presentation could be in oral or poster manner and the oral presentation will be led by keynote speaker for each session. It is encouraged if you want to be one of the keynote speaker, please send the title of your suggested keynote speech to the Organization Office as soon as possible.
4. A collection of selected abstracts is planed to be printed out before the workshop, please give the authorization to the Organization Office for publishing at the same time you submitting your abstracts, or you can only give presentation during the workshop time.

### Costs

1. The registration fee is \$200 USD (~¥1500 RMB) for a regular delegate, and \$100 USD (~¥750 RMB) for students and spouse. The registration fee covers Costs of proceedings, lunch, dinner during conference and social events..

2. Accommodation in Jinjiulong Hotel (two bed room with breakfast) is approximately \$40 USD (~¥300RMB) per day. Some cheaper room can be arranged by the Organization Office upon arriving for students.

3. Some post-conference excursion routes are scheduled for your selection:

Route 1: Three Gorges dam + Yangtze Three Gorges Scenery Tour

Route 2: Three Gorges dam + Shenglongjia National Forest Park Tour

Route 3: Zhangjiajie National Forest Park-World Natural Heritage (World Geo-park) Tour, check [www.zjjtrip.net](http://www.zjjtrip.net) for detail.

The cost for each route is approximately \$160 USD (~¥1300RMB), depend on bus and hotel class.

4. Some booths (3×2m) are available for exhibition, the cost is from \$500-1000USD. Please contact Organizing Office in advance.

You can check the workshop homepage (<http://kletor.yangtzeu.edu.cn>) for more information.

Or contact: Secretaries for Organizing Office:

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## Typographical Instructions

1. Extended abstract is limited for 4 pages (include figures and tables);
2. Page size is set to format 16 (18.4×26 cm), with margins: left 3cm, right 2.5cm, top 3cm and bottom 3cm;
3. Font for title: Times New Roman, bold, size 14, centered
4. Font for authors: Times New Roman, size 12
5. Font for affiliation: Times New Roman, italic, size 9
6. Font for text title1: Times New Roman, bold, size 12
7. Font for text title2: Times New Roman, italic, size 10
8. Font for text: Times New Roman, size 10
9. Font for caption of figure and table: Times New Roman, bold, size 9, centered
10. All line spacing is set to be 1.25.

Below is a modal version for reference:

# NEAR SURFACE VELOCITY IMAGING WITH THE RESISTIVITY INVERTED FROM TEM\*

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## Abstract

Contrasting the resistivity profile inverted from the shallow transient electromagnetic sounding (STEM) with the stratum velocity observed by mini-logging at the same line showed that the coherence of the shallow structure of stratum velocity and the layered resistivity is perfect, and the relationship between stratum velocity and resistivity is non-linear. Based on Faust formula, the method in which the stratum velocity is approached as a polynomial function of resistivity and depth in logarithm domain was put forward. By the use of the stratum velocity from mini-logging and the resistivity from STEM the coefficients were calculated with conjugate gradient method, so the experiential formula of stratum velocity as a function of resistivity and depth was derived, with this formula the velocity was imaged upon the resistivity profile. The result is important and valuable to the identification of the low velocity boundary, and also helpful to the establishment of velocity model for seismic static correction.

## Introduction

Static Correction of 2D and 3D seismic prospecting in the rugged areas of the western China has not been resolved yet, because the velocity model of shallow surface has not been established. A little bit effective ways is to use mini-reflection seismic or macro-reflection seismic or mini-logging data to built the surface velocity model, these are costly and scale limited, and at the same time the site choosing is random, so it is difficult to solve the static correction<sup>[1]</sup>.

Generally, the depth of the bottom of low velocity zone is smaller than 300 meters, in which the layered velocity is relative to the resistivity and geology layer. Based on the high resolution profile of resistivity, and at the same time with the help

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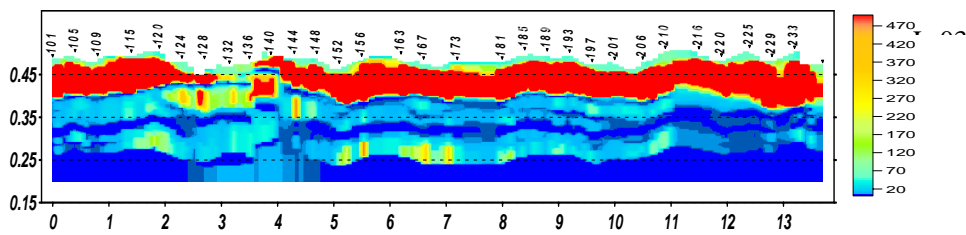
Email: yanliangjun\_85@hotmail.com

of mini-logging calibration for the resistivity and velocity, the relationship between geo-electrical structure and lower velocity zone was studied, an empirical transformation function from velocity to resistivity was found<sup>[2]</sup>. So the surface velocity model was established, with which the static correction of seismic was carried effectively, and the application effect of seismic prospecting was enhanced in rugged areas.

#### *Interface Contrast of inverted resistivity*

The trial line of STEM is 14km long, in which 138 sites with sampling space of 100 m were measured, at each site MuTEM and FaSTEM were carried out. Figure 1 is the higher resolution profile of resistivity inverted from STEM data, seven layers can be seen from the surface to the depth 300 m. The first layer from depth 0 m to 50 m is resistive sandstone of quaternary; the second layer from depth 50 m to 100 m is higher resistive dry sandstone, the resistivity is more than 200 Ωm; the third layer is conductive shale with 20 m thickness; the layers from fourth to seventh with depth from 100 m to 300 m are tertiary rocks in which resistivity and conductivity changes like sandwich.

There were three mini-logging wells situated at the head, middle and the end of trial line. Table 1 showed the contrastive results of mini-logging and STEM. It illustrated that the layers of resistivity are more than the layers of velocity. The inflexions of the time-distance curve which are the bottoms of velocity layers are consistent with the interfaces of resistivity inverted from STEM, the standard division of fitting was little than 3.6%, this indicated that the resistivity profile was precise and truthful. In the Figure 1 and Table 1 we also found that the resistivity generally decreases along with the increase of depth, and the velocity is on the contrary, it seems that there is possibility to find the relationship between resistivity and velocity.



**Figure 1. Inverted resistivity profile of trial line with STEM data(arrow: mini-logging)**

#### *The Theory of Velocity Imaging*

The study of the imaging method of how to translate the inverted resistivity

profile of STEM to the velocity profile with the help of mini-logging curves was the most important part of the trial. The test has proved that there are intrinsic relations among geophysical parameters in the same rock, and at the same time the velocity of the rock is relative to the depth.

**Table 1 Interface depths contrast of velocity layer from mini-logging**

Mini-logging WS#	Depth of electrical layer (m)	Depth of velocity layer(m)	Velocity (m/s)
L-02/ FM03	16.0	16.5	600
	97.5	92.	1296.9
			1623
L-01/ FM03	14.9	14.5	565
	?	35	832
	98.9	106.5	1383.9
			1749
L-03/ FM03	12.2	12	525.8
	44.9	45	797.9
	76.1	69	979
	92.3	93	1429
			2239

## Conclusion

Geo-electrical layers and their resistivity value on the inverted profile are coherent with the velocity layers and their value on the curve of mini-logging, this is the base to the study of relationship between resistivity and velocity. A modified Foust formula was given by the use of high order polynomial approaching in log-domain, and the effective algorithm was given also. The velocity profile imaged from the inverted resistivity and the curves of mini-logging is of great value to the static correction of seismic data.

## References

1. Yan Liangjun, Xu Shizhe et al., Fast resistivity imaging of central loop transient electromagnetic sounding and its application. Geology and exploration of Coal field, 2002, Vol.20(6), 58~61.
2. Sternberg B K, Washburne J C and Pellerin L. Correction for the static shift in magnetotellurics using transient electromagnetic soundings. Geophysics, 1988, Vol.53(11):1459~1468.