

Istituto Nazionale di Oceanografia
e di Geofisica Sperimentale



Imaging of Moon subsoil while drilling

By

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Moscow workshop November 16th-17th 2006



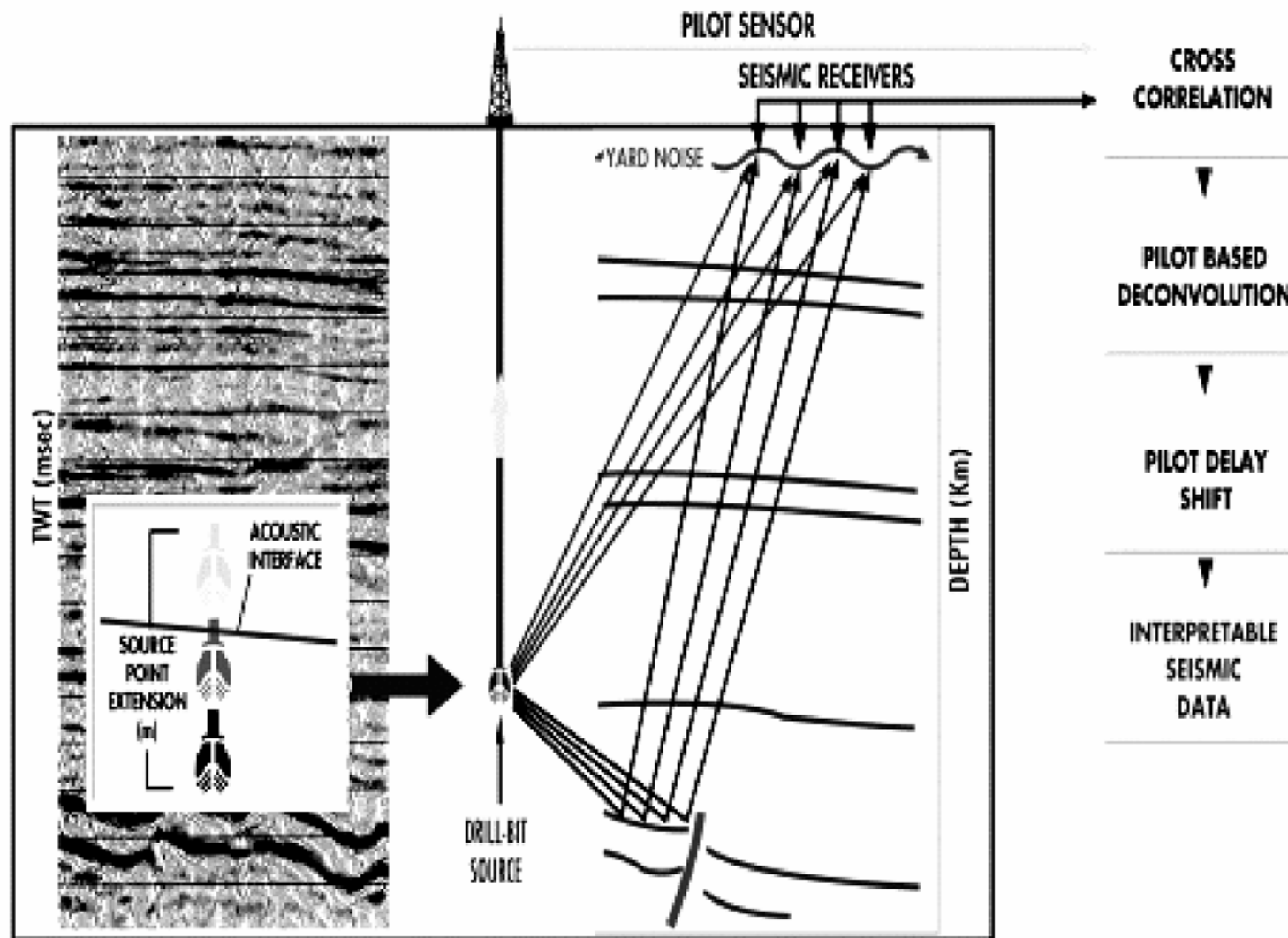
International Conference
MOON BASE a Challenge for Humanity
Venice Workshop, MAY 26th-27th 2005
Washington D.C. Workshop, OCTOBER 11th-12th 2005
Moscow Workshop, NOVEMBER 16th-17th 2006



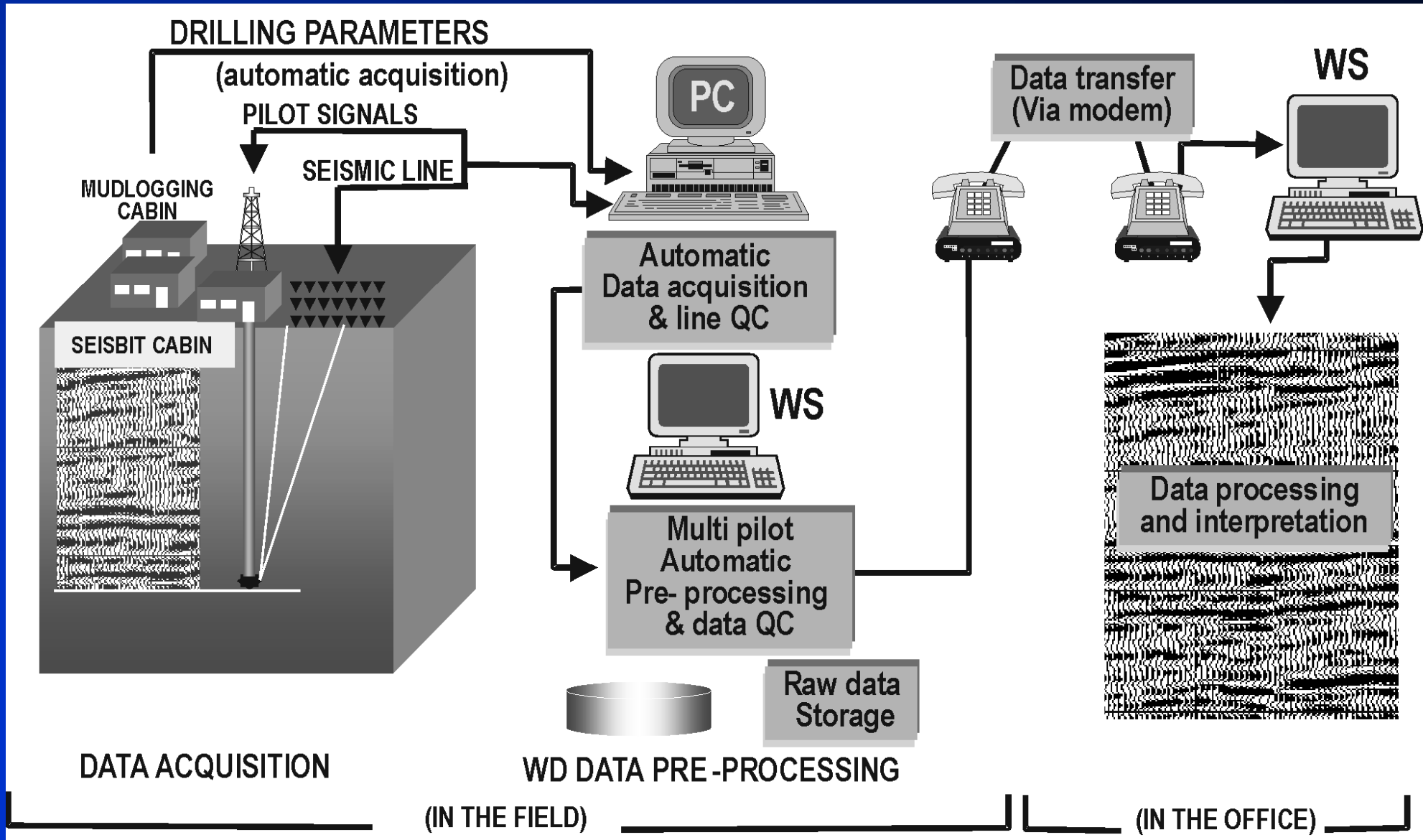
Outline of the presentation

- Concept of SWD by using passive drilling noise source
- Overview of WD automated drill-bit technology
- Main geophysical products
- SWD for oil exploration and other applications
- Imaging of the subsoil while drilling
- From the Earth to the moon: a new drilling scenario?

The drill-bit seismic while drilling concept



Automated technology driven by drilling parameters



Application of drill-bit seismic for oil&gas exploration



← Wellsite area monitoring

The bit source →

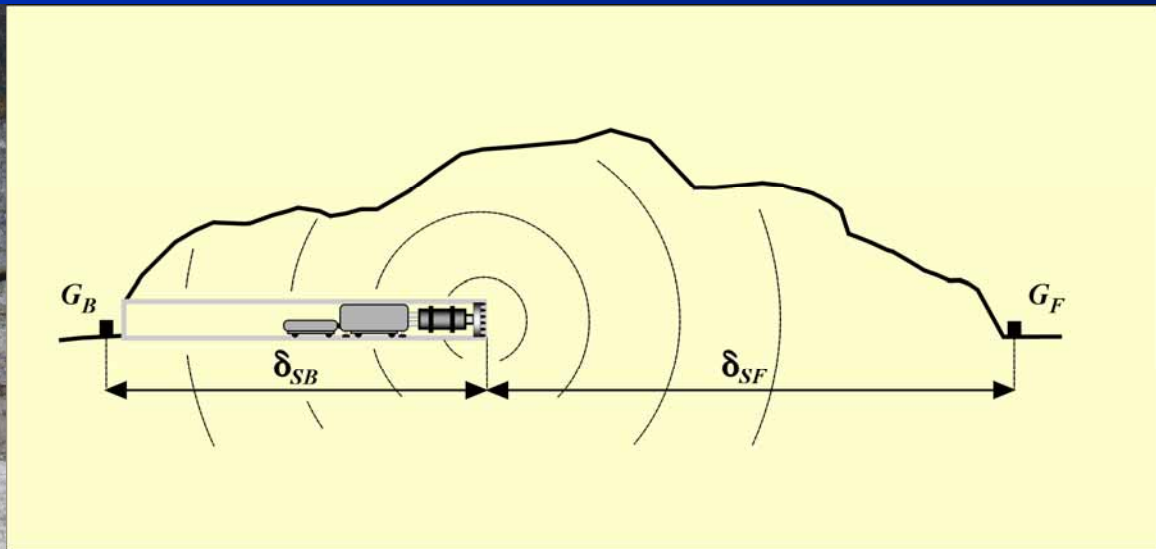


Other examples of SWD application

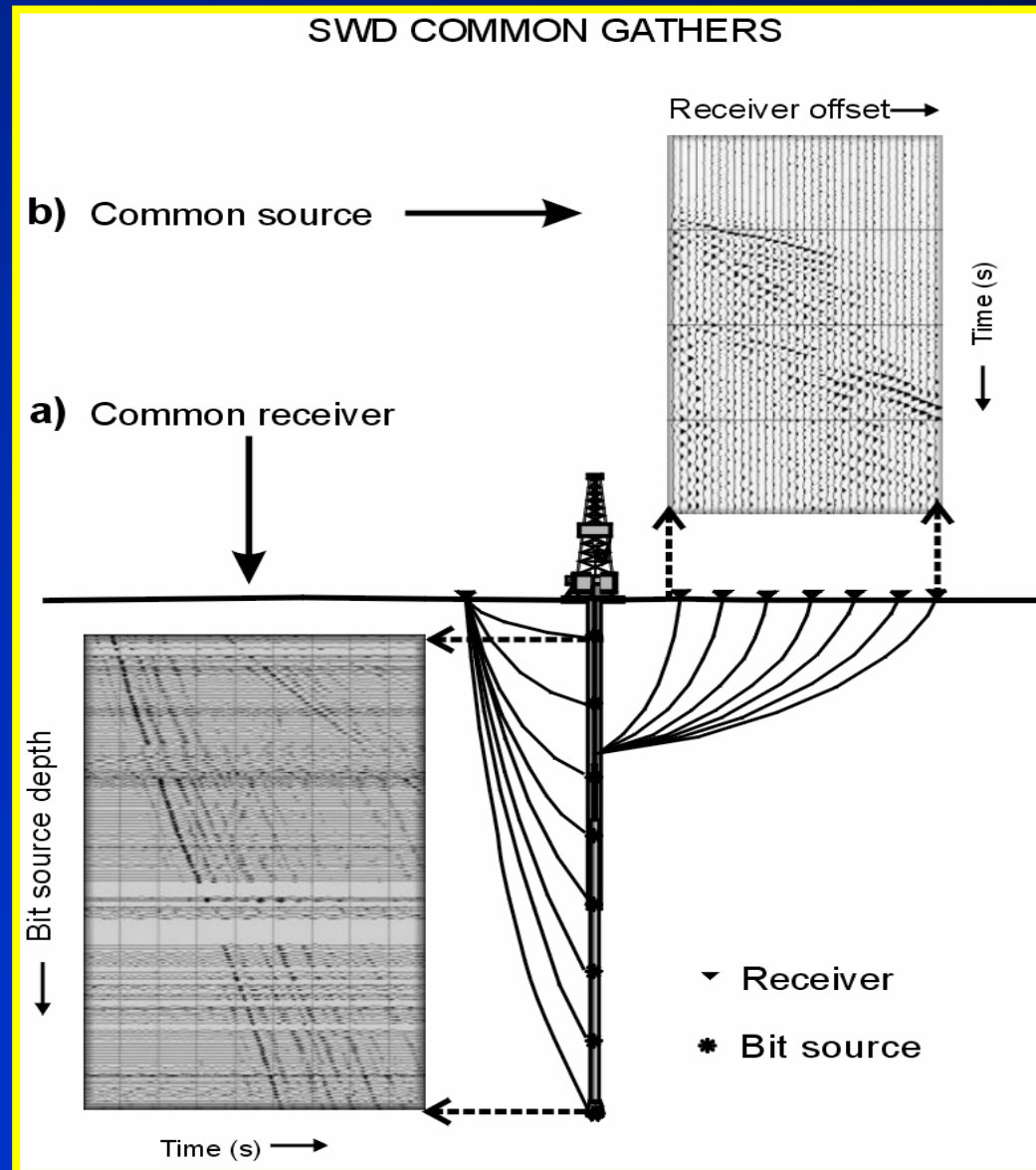
➤ Geothermal drilling exploration



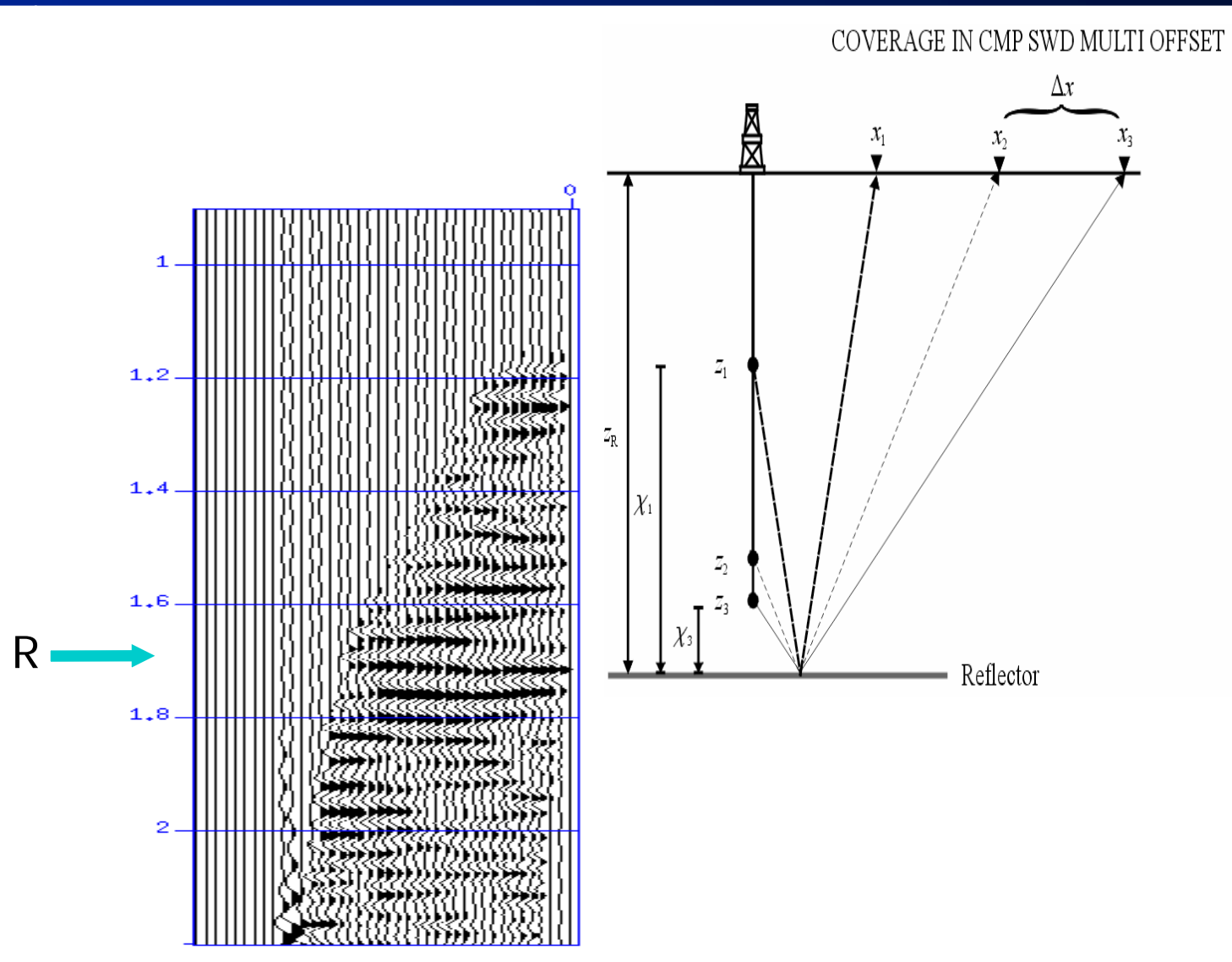
➤ Tunnel excavation



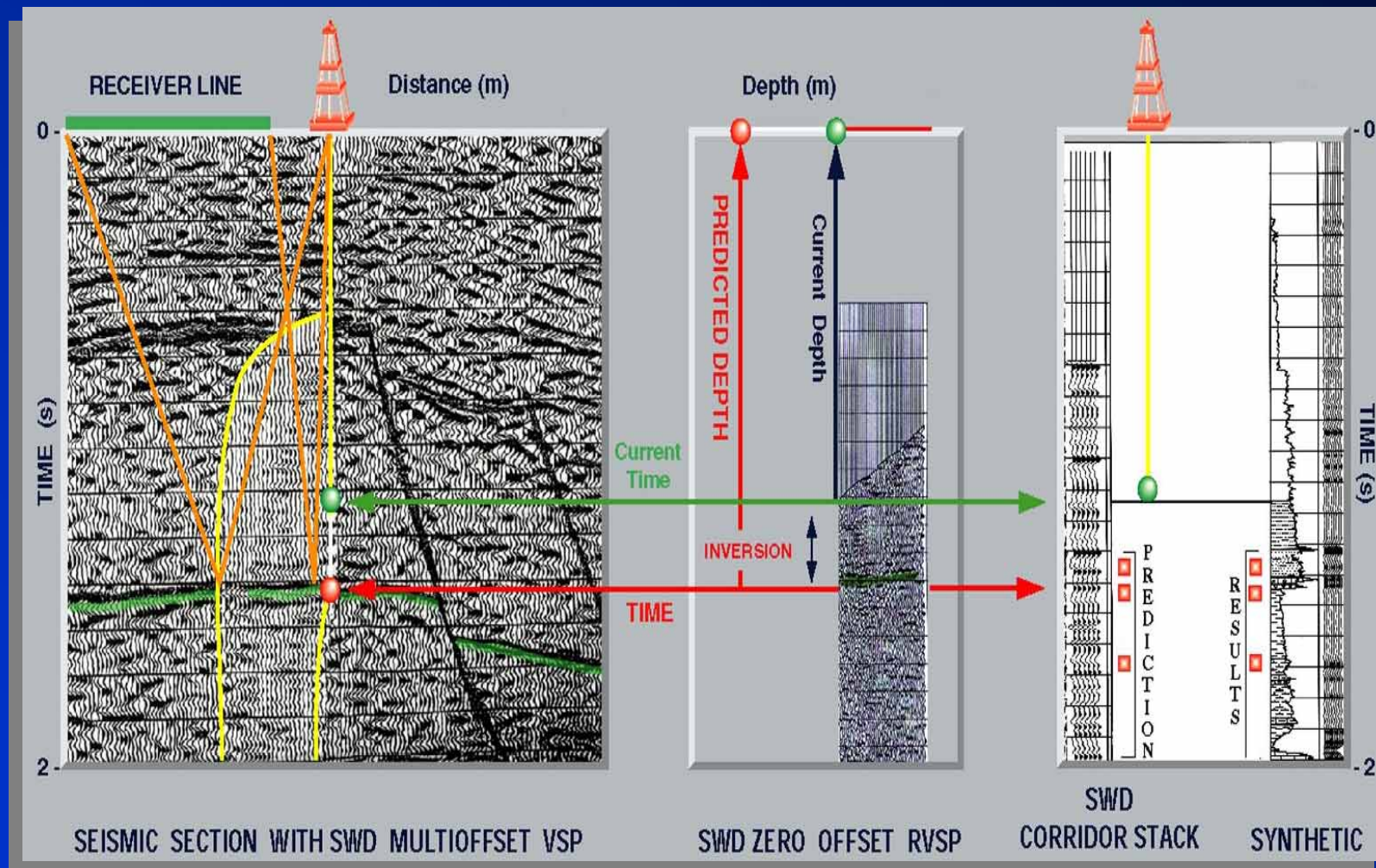
Coherent signals from drilling noise



Imaging of reflections ahead and around the bit



Integration of geophysical and geological data



Subsoil imaging in 3D and depth geological model

Investigation distance and resolution power related to signal frequency content

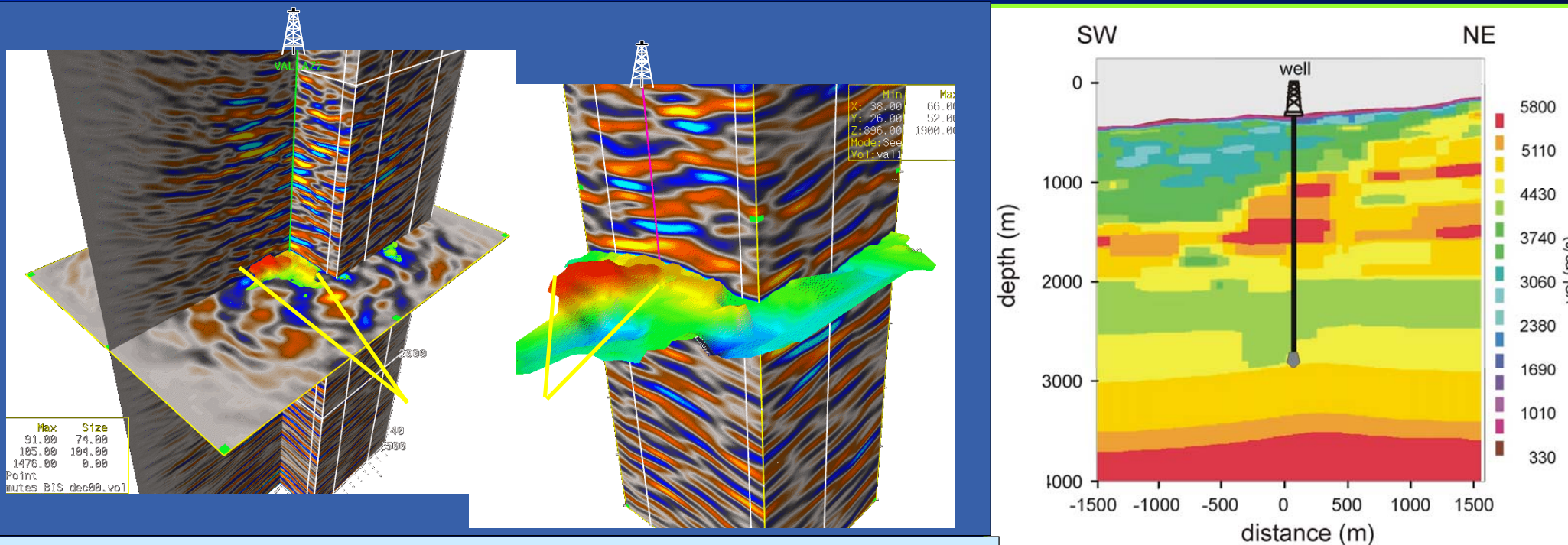
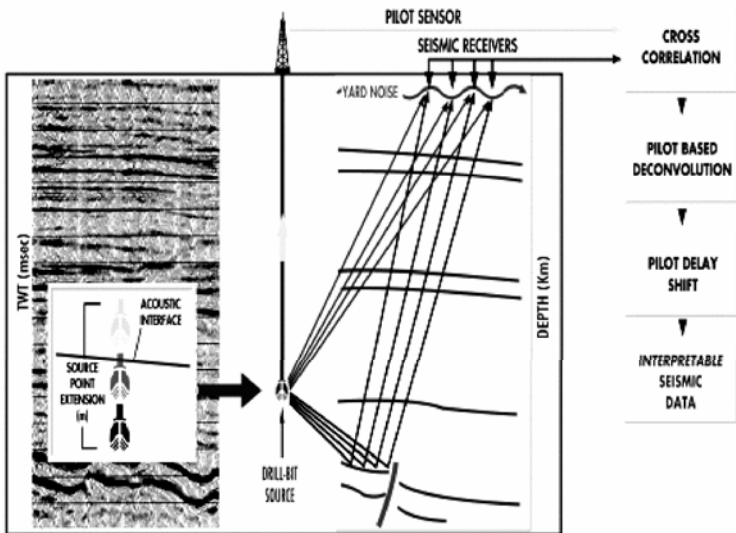


Fig. 8 – 3D WD RVSP results

Moon base scenario

From Earth to Moon:

SWD as a possible exploration tool



Main issues

- **Passive source without interference with drilling activity**
- **Integration of drilling and acoustic monitoring technology by using surface and downhole drilling vibration sensors**
- **Automated technology driven by drilling parameters**
- **Look ahead while drilling**
- **Reduce drilling risk by predicting obstacles in unknown areas**
- **Obtain geophysical information by SWD and interferometry around the drilling site**

Conclusions

- **Passive methodology used for seismic interferometry**
- **No extra drilling risks**
- **High benefits in terms of additional information in unexplored areas**
- **Technological challenge for geophysical research**

