

**ICDP-OSG at GFZ - DOWNHOLE LOGGING**  
**SRS DP Mountain Home AFB 2012**

The OSG downhole logging team of the Operational Support Group of the ICDP from 16-24-June-2011 successfully performed the measurements in the Mountain Home AFB borehole of the Snake River Scientific Drilling Project, Idaho, USA.

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Processing: Jochem Kück (as of 20-FEB-2012)

**Downhole logging measurements**

- The theoretical vertical resolution of the sondes are:

GR (total natural gamma ray)	20 cm
SGR (spectrum natural gamma ray)	20 cm
MS (magnetic susceptibility)	20 cm
BS (sonic)	50 cm
DLL (resistivity)	80 cm
DIP (dip)	1 cm
DIP (caliper, orientation, mag. field)	5 cm

**SRS DP MH AFB: max. driller depth = 1675 m, max. accessible depth for logging = 1672 m**

**Cased hole section (CH):**

- 0 - 619 m      PQ pipe, cemented
- 0 - 1166 m    HQ pipe, not cemented
- 0 - 1675      NQ pipe, only during the first log (SGR-TEMP) as protection pipe,  
was tripped out completely after this

**Drilling sections (bit size):**

- 619 - 1166 m    ->    bit size = 98 mm (HQ)
- 1166 - 1675 m ->    bit size = 77 mm (NQ), the only OH section

**Data File Format:**

SRSDPMH composite OH.txt	= ASCII	(all data from the OH section, except waveforms & dipmeter)
SRSDPMH composite OH.wcl	= WellCAD 4.3 (	" )
SRSDPMH composite OH.pdf	= Plot 1:2250 of the WellCAD file	
SRSDPMH TEMP.txt	= ASCII	(TEMP, Pressure & MRES)
SRSDPMH TEMP.wcl	= WellCAD 4.3 (	" )
SRSDPMH TEMP.pdf	= Plot 1:8000 of the WellCAD file	
SRSDPMH103, 104.lis	= LIS	(sonic full waveforms)
SRSDPMH103, 104.wcl	= WellCAD 4.3 (	" )
SRSDPMH DIP.txt	= ASCII	(complete dipmeter data)
SRSDPMH DIP.wcl	= WellCAD 4.3 (	" )
SRSDPMH SGR HQ.txt	= ASCII	(SGR data from HQ CH section)
absent value = -999.25 (missing value)		

## **SRSDP MH AFB - OSG Logging Data Processing**

**GR\_Master**, total gamma ray: all other logs depth corrected according to this log.  
GR\_Master = GR from SRSDP106 (continuous TEMP log measured downwards with 8 m/min), comparison with GRs from all other upward logs show no differential depth shift.  
Data is as measured, i.e. not corrected for casing effects (attenuation of the drill pipe).  
Differences in GR measured in OH and in the same section with NQ pipe show nearly no difference.

**SGR**, K, U and Th content:

SGR was run in the OH NQ section and in CH inside the HQ and NQ drill pipes.  
Correction of the log in the HQ cased hole section (HQ hole & pipe) was done for attenuation of the drill pipe (thickness) with SGR correction chart. Bit size and mud density effects are much smaller and neglectable.

HQ hole size = 98 mm, water, ave. rock density = 2.9 g/cm<sup>3</sup>, HQ pipe thickness = 5.6 mm/0.22".

Chart based correction factors:

casing effect:  $f_{U\&K} = 1.19$ ,  $f_{Th} = 1.165$

In the section above 619 m SGR was not measured because of the double casing (PQ & HQ).

The SGR log in the OH was not recorded continuously but in 2 sections (top->bottom):

SRSDP098

SRSDP097

**MP** and **TEMP**, Mud Parameters: TEMP, pressure, MRES:  
data as measured.

**MS**, Magnetic Susceptibility:

data after chart based correction for bit size, the applied correction factors are:

OH section ->  $f_{corr} = 1.15$

**BS**, Sonic, Vp: p-wave, Vs: s-wave (sonic velocities):

Vp was obtained with three different processing methods: the manual first arrival picking method in Geobase with very poor results (denoted as Vp\_Geobase), automated first arrival picking in WellCAD (Vp\_FAP), and the Semblance Analysis of the two waveforms in WellCAD (Vp\_SA). The two WellCAD methods show nearly the same results.

Vs could only be estimated with the Semblance Analysis method because Vs first arrivals are not clearly detectable in the waveforms.

For comparison also the water wave speed was determined with the SA method (Vw).

The sonic log was not recorded continuously but in 2 sections (top->bottom):

SRSDP104

SRSDP103

The sonic waveform data (LIS file format) is also delivered here to allow further processing.

The sampling rate was 6.4  $\mu$ s.

**DLL**, Resistivity:

Rd = deep measurement (> 190 cm); Rs = shallow measurement ( $\approx$  60 cm), data as measured.

**DIP**, Dipmeter:

Borehole caliper: CAL1&2(perpendicular) as measured, from DIP  
Orientation: DEVI = deviation from vertical, DAZI = hole azimuth, AZIM = pad1 azimuth  
Ftot (total magnetic field amplitude): calculated from Mx, My & Mz  
Pad1,2,3,4 are the resistivity traces (uncalibrated) from the four electrode pads.  
The data gap was caused because of actions taken after the sonde got stuck.  
The DIP log was not recorded continuously but in 2 sections (top->bottom):  
    SRSDP085  
    SRSDP083  
Note: the z-component is in sonde axial direction, z & y are perpendicular!