

ICDP-OSG at GFZ - DOWNHOLE LOGGING SRSDP Kimama 2011

The OSG downhole logging team of the Operational Support Group of the ICDP from 29-June-04-July-2011 successfully performed the measurements in the Kimama borehole of the Snake River Scientific Drilling Project, Idaho, USA.

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Processing: Jochem Kück (02-DEZ-2011)

Downhole logging measurements

- The theoretical vertical resolution of the sondes are:

GR (total 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
FAC40 (images)	0.05 cm

SRSDP Kimama: max. driller depth = 1912 m, max. accessible depth for logging = 1150 m

Cased hole section (CH): 0 - 277 m cemented

Drilling sections (bit size): 277 - 1189 m -> bit size = 98 mm (HQ)
1189 - 1912 m -> bit size = 77 mm (NQ)

The NQ section was not accessible for the wireline sondes.

Data File Format:

SRSDP Kimama composite.asc = ASCII (all data except images, waveforms & dipmeter)
SRSDP Kimama composite.wcl = WellCAD (")
SRSDP Kimama composite.pdf = Plot 1:5000 of the WellCAD file
SRSDP076+077 FAC oriented shifted.lis or .wcl = FAC40 televiewer data, LIS & WellCAD format
SRSDP064,065,066.lis = LIS sonic full waveforms - NOT DEPTH CORRECTED ->
to be shifted -5.8 m (upwards)
absent value = -999.25 (missing value)

SRSDP Kimama - OSG Logging Data Processing

GR_Master, total gamma ray from the MP-MS log (first log and with smoothest conditions): all other logs depth are corrected according to this log. (GR = total Gamma Ray from telemetry-sonde). Data is as measured.

MS, Magnetic Susceptibility:

data after chart-based correction for bit size, the applied correction factor is: $f_{corr} = 1.2$

BS, Sonic Velocity:

Vp: p-wave, Vs: s-wave

Vp was obtained with three different processing methods: the first arrival picking method in Geobase (denoted as Vp), first arrival picking in WellCAD (Vp-FAP), and Semblance Analysis of the waveforms (Vp_SA). In general all three methods show nearly the same results. In the Kimama Composite file the average of Vp-FAP & Vp_SA is given. Vs could only be estimated with the Semblance Analysis method.

The sonic measurements were not recorded continuously but in 3 sections:

SRSDP066

SRSDP065

SRDSP064

The sonic waveform data (LIS file format) is also delivered here to allow further processing. Please note the LIS data is not depth corrected. It has to be shifted upwards. i.e. Depth - 5.8 m.

DLL, Resistivity:

Rd = deep measurement (> 100 cm); Rs = shallow measurement (\approx 60 cm), data as measured.

SRSDP062

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

The DIP measurements were not recorded continuously but in 8 sections because the caliper arms got stuck several times and the measurement had to be stopped to close the arms, for half of the runs the arms were closed

(top->bottom):

SRSDP074 c SRSDP073 SRSDP072 c SRDSP071

SRSDP070 c SRSDP069 SRSDP068 c SRSDP067

Note: the z-component is in sonde axial direction, z & y are perpendicular!

FAC40, Televiwer:

Images, oriented to North: RUNT = runtime = radius, AMPL = amplitude = reflection strength

Ftot calculated from Magx,y,z (uncalibrated)

Acoustic borehole caliper: CAL1&2 (perpendicular), $V_{mud} = 1680$ m/s

Rad1,2,3,4 = radius1+3 and radius2+4 are on opposite sides

Orientation: DEVI = borehole deviation from vertical, DAZI = borehole azimuth, AZIM = azimuth of Rad1

As the sonde contains no GR, depth correction was done by comparison of the computed Ftot_FAC with Ftot from the DIP run, which is depth corrected according to the GR_Master (top->bottom):

SRSDP076

SRSDP077

Note: the z-component is in sonde axial direction!

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