Data Archive DFDP Seismic extended 3D surface and VSP survey (Alpine Fault 3D-VSP)

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Introduction

This seismic data set was acquired in 2016 by a joint effort of several partners. A detailed field report describes the field procedures and available data:

Townend, J., Eccles, J., Kellett, R., Buske, S., Constantinou, A., Schmitt, D., Betram, M., Hall, K., Savage, M., Gorman, A., Kofman, R., Benson, A., Lay, V., Gulley, A., McNab, A., Lidsay, D., Hopp, C., Mann, C., Bodenburg, S.B., Kleine, F., Lepine, P., Bowman, H., Broderick, N., Capova, L., Lawton, D. (2016): Whataroa 2016 seismic experiment acquisition report (GNSScienceReport 2016/36). Lower Hutt, NewZealand: GNS Science. https://doi.org/10.21420/G2TK9T.

Within this archive, we provide

1. Coordinate lists and
2. Correlated data with local coordinates.

Further detailed information for these data are given below.
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- German Research Foundation DFG (BU1364/14),
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- NSERC discovery and Canada Research Chairs Program,
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- and the Alberta Government.

Cube data recorders were provided by the Geophysical Instrument Pool Potsdam (GIPP).

1) Coordinates

The coordinate lists contain the absolute coordinates (as New Zealand Transverse Mercator and latitude/longitude) and local coordinates for all source and receiver locations. These local coordinates are used in the header information of the correlated data.

The files contain the following columns:
ID (of source or receiver location), NZTM E (in meter), NZTM N (in meter), height above sea level (in meter), latitude (in degree), longitude (in degree), local x-coordinate (in meter), local y-coordinate (in meter), local z-coordinate (in meter)

Files:
- coordinates-source.dat
- coordinates-receiver.dat

2) Correlated field data

The uncorrelated field data as described in the field report by Townend et al. (2016) are planned to be made available soon. The correlated data set is derived by using the uncorrelated field data and time breaks to correlate the pilot sweep at each source location with the respective recordings. Local coordinates are used in the header of the seismic data files. Table 1 summarises the recorded data sets and the corresponding file names. Respective file names and formats are presented in Table 1. Data is given in sgy-format. Table 2 provides a description of the header words set for all sgy files for the correlated data.

Table 1: Overview of used separate parts of the data set and the corresponding file names for the correlated data.

receiver at/in	receiver type	specification	receiver location	source location	receiver component	file name correlated data
surface	Aries (1C)		Line 1000	Line 2000	vertical	srf_1C_Aries_part1.sgy srf_1C_Aries_part2.sgy srf_1C_Aries_part3.sgy
			Line 1000	Line 4000	vertical	
			Line 1000	Line 8000	vertical	
			Line 3000	Line 2000	vertical	
			Line 3000	Line 4000	vertical	
			Line 3000	Line 8000	vertical	
	Cubes (3C)		coarse grid	zero-offset	vertical & horizontal	srf_3C_cubes_coarsegrid.sgy
			coarse grid	Line 2000		
			coarse grid	Line 4000		
			coarse grid	Line 8000		
			fine grid	cubeloop	vertical & horizontal	srf_3C_cubes_finegrid_part1.sgy srf_3C_cubes_finegrid_part2.sgy srf_3C_cubes_finegrid_part3.sgy
	Cubes (1C)		small array	Line 2000,4000,8000	vertical	srf_1C_cubes_arieslines.sgy
			small array	cubeloop	vertical	-
	Reftek (3C)		5 distinct	all	vertical & horizontal	-
borehole	Sercel (3C)	zero-offset (10-200 Hz)	z=0-300 m (bsl)		vertical & horizontal	bh_3C_sercel_zerooffset.sgy
		walkaway	z=0-300 m (bsl)	Line 2000	vertical & horizontal	bh_3C_sercel_walkaway_part1.sgy bh_3C_sercel_walkaway_part2.sgy bh_3C_sercel_walkaway_part3.sgy
				Line 4000	vertical & horizontal	
				Line 8000	vertical & horizontal	
				cupeloop	vertical & horizontal	
	hDVS	zero-offset (10-200 Hz)	z=-95-720 m (bsl)		vertical	-
		zero-offset (10-60 Hz)			vertical	
		walkaway		10 (on lines 2000-8000)	vertical	bh_DAS.sgy

Table 2: Header information for sgy files of the correlated data.

header word (seismic unix)	byte	Description
fldr	009 – 012	source point ID
tracf	013 - 016	receiver point ID
cdpt	025 - 028	receiver component number (for 3C-receivers)
offset	037 – 040	offset in decimeter
gelev	041 - 044	height (below sea level) of geophone in decimeter
selev	045 - 048	height (below sea level) of source point in decimeter
scalel	069 - 070	scalar to transfer height values to meter
scalco	071 - 072	scalar to transfer coordinates to meter
sx	073 - 076	source point local x-coordinate in decimeter
sy	077 - 080	source point local y-coordinate in decimeter
gx	081 - 084	receiver point local x-coordinate in decimeter
gy	085 - 088	receiver point local y-coordinate in decimeter
ns	115 - 116	number of samples per trace
dt	117 - 118	sampling interval in microseconds