The Secret Model

Dublin Secret Model II - DSM2

THE DISCLOSURE

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MT 3D Inversion Workshop II, 30th March - 1st April 2011

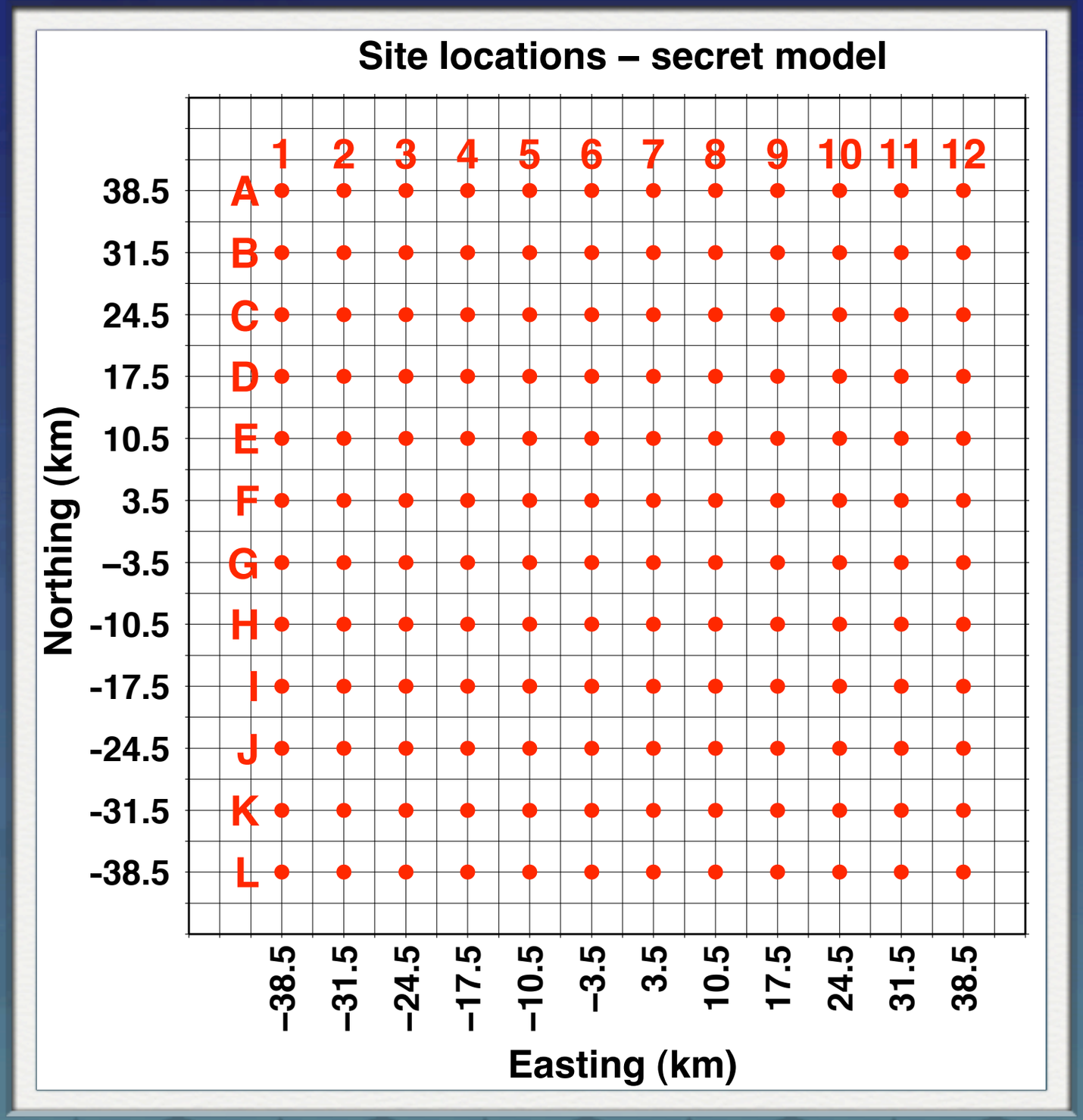
The Data Set

144 sites in a regular
12 x 12 array
distribution

site spacing 7 km

30 periods:
0.016 s - 10 000 s

resistivity structure:
0.1 Ωm - 100 Ωm



Calculation of the Synthetic Data Set

3D Forward Tool of WINGLINK was used to set up the model and calculate the forward responses

mesh of 64 x 64 x 33 cells

Centre cells of 2 km horizontal extent, 50 m vertical extent first layer increasing downwards

and then ....

Add Distortion & Noise

Random galvanic distortion has been applied to the synthetic data set

C Matrix according to Groom-Bailey Decomposition generated by following random numbers:

twist angle within ± 60°

Shear angle within ± 45°

Anisotropy within ± 1

fixed gain set equal to 1

Random Gaussian noise was applied to distorted Data Set

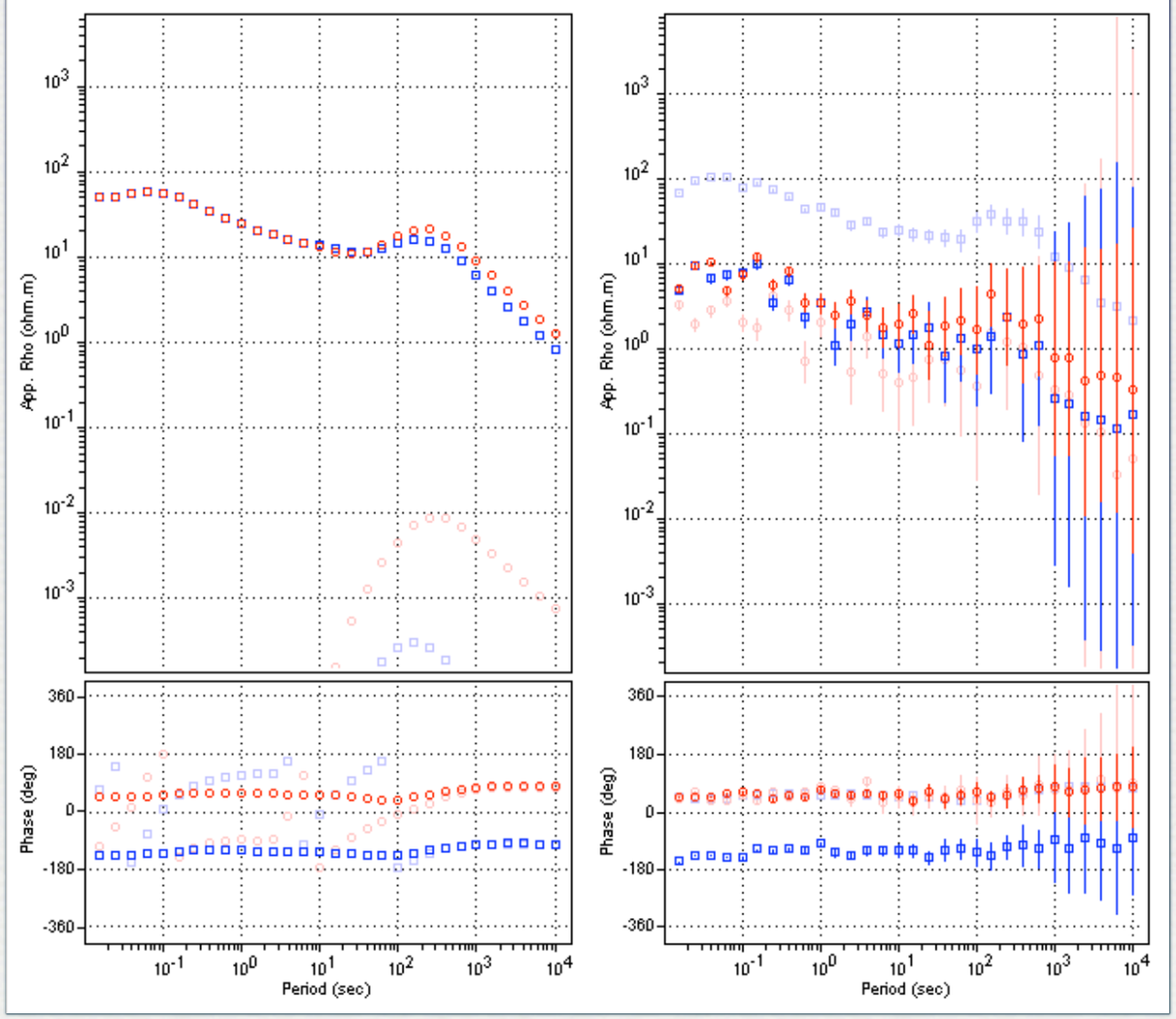
5% of the maximum impedance value

Add Distortion & Noise

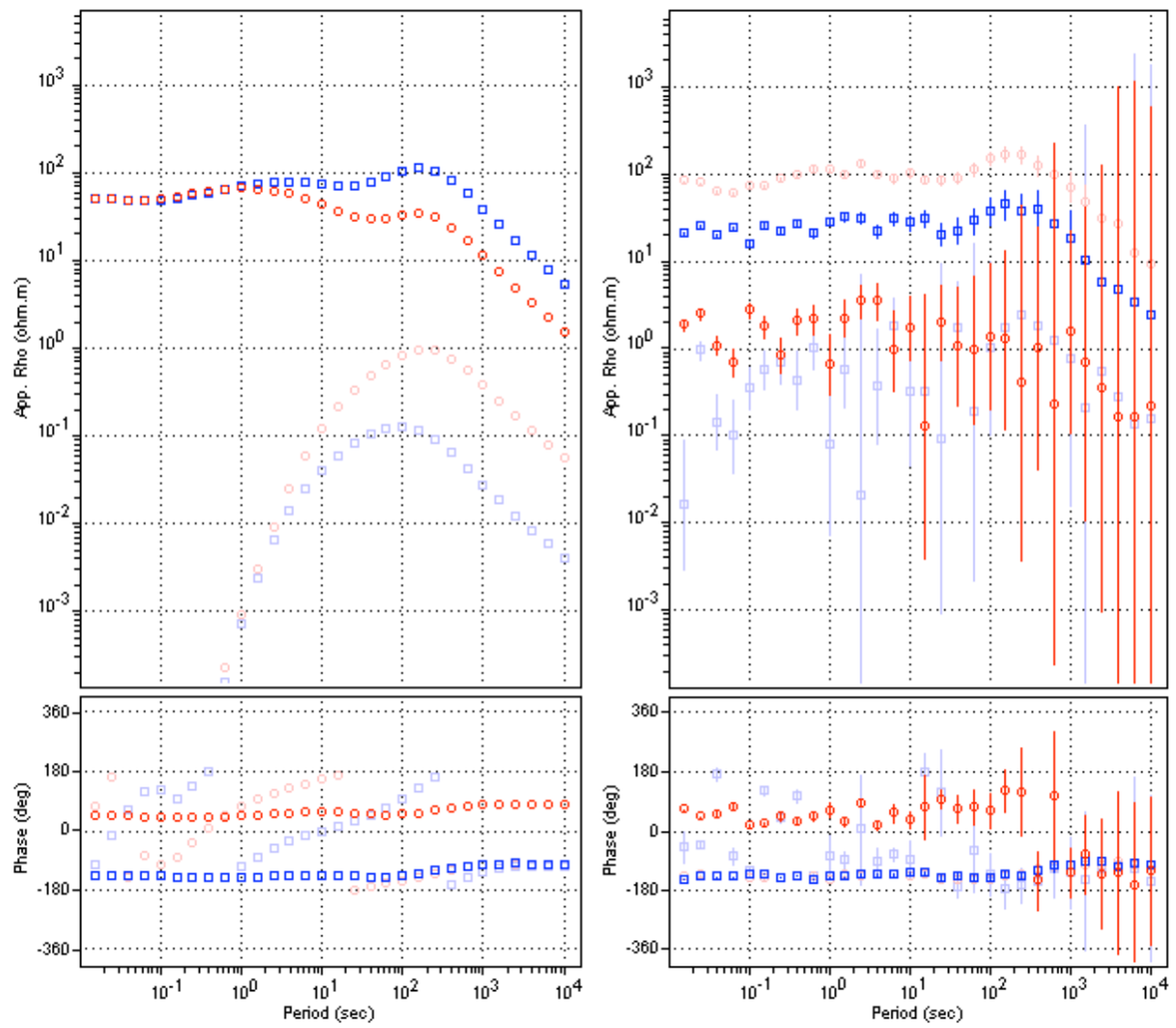
Site	C_{11}	C_{12}	C_{21}	C_{22}	twist	shear	gain	anisotropy
A01	0.44246	0.12840	-0.00919	1.33703	-3.33748	2.14793	1.00000	-0.50435
A02	0.91106	-0.42558	0.72448	0.68116	35.24428	3.24770	1.00000	0.18342
A03	0.55258	0.70617	-0.05072	1.09243	-19.06183	13.81786	1.00000	-0.40195
A04	1.26382	-0.48761	-0.08906	0.39633	23.43243	-27.46315	1.00000	0.33693
A05	1.23925	-0.65871	0.08177	0.15382	40.31563	-36.54049	1.00000	0.29479
A06	1.14510	-0.05135	0.66963	0.48754	18.16551	12.15253	1.00000	0.46031
A07	0.73599	0.09335	0.83145	0.87080	21.18342	27.30183	1.00000	0.11812
A08	0.27957	-0.00170	-0.14216	1.37899	-13.44130	-13.51212	1.00000	-0.62941
A09	1.38148	-0.10915	-0.12114	0.25482	9.08807	-14.09939	1.00000	0.66681
A10	0.96629	-0.11917	0.59710	0.83400	19.92263	11.79087	1.00000	0.14831
A11	1.08514	-0.20353	0.15800	0.86952	10.72932	-2.44496	1.00000	0.10231
A12	0.97344	0.36296	0.06217	0.95750	-8.55289	12.20730	1.00000	-0.02429
B01	1.04126	0.22199	-0.51268	0.77695	-21.07983	-5.13419	1.00000	0.17910
B02	0.65774	-0.49255	-0.07286	1.14868	8.44439	-14.76521	1.00000	-0.30763
B03	1.01994	0.14052	-0.58534	0.77289	-20.07806	-9.77350	1.00000	0.19903
B04	0.53733	-1.17802	-0.30022	0.48312	19.25403	-48.44687	1.00000	-0.34823
B05	1.22028	-0.19882	0.17309	0.66439	12.36648	-4.29347	1.00000	0.27985
B06	0.61259	-0.11473	0.95652	0.83465	32.59488	24.76827	1.00000	0.14829
B07	0.88246	0.42279	-0.05006	1.01980	-12.88222	9.63564	1.00000	-0.11072
B08	0.92719	-0.29604	0.86975	0.54426	35.85595	7.31310	1.00000	0.34466
B09	0.78608	0.23378	-1.06326	0.44375	-40.65281	-12.87124	1.00000	0.44999
B10	1.29005	0.30434	0.01516	0.49286	-15.51092	16.18423	1.00000	0.38028
B11	1.01128	-0.69808	0.32188	0.62161	32.98614	-15.33029	1.00000	0.06340
B12	0.14812	-0.42223	0.03676	1.34106	15.70719	-1.76919	1.00000	-0.80417

Comparison of Data with & without distortion and Noise

site F12



site H09



3D Resistivity Structure

Well Known Structure

Often Used for Code Testing

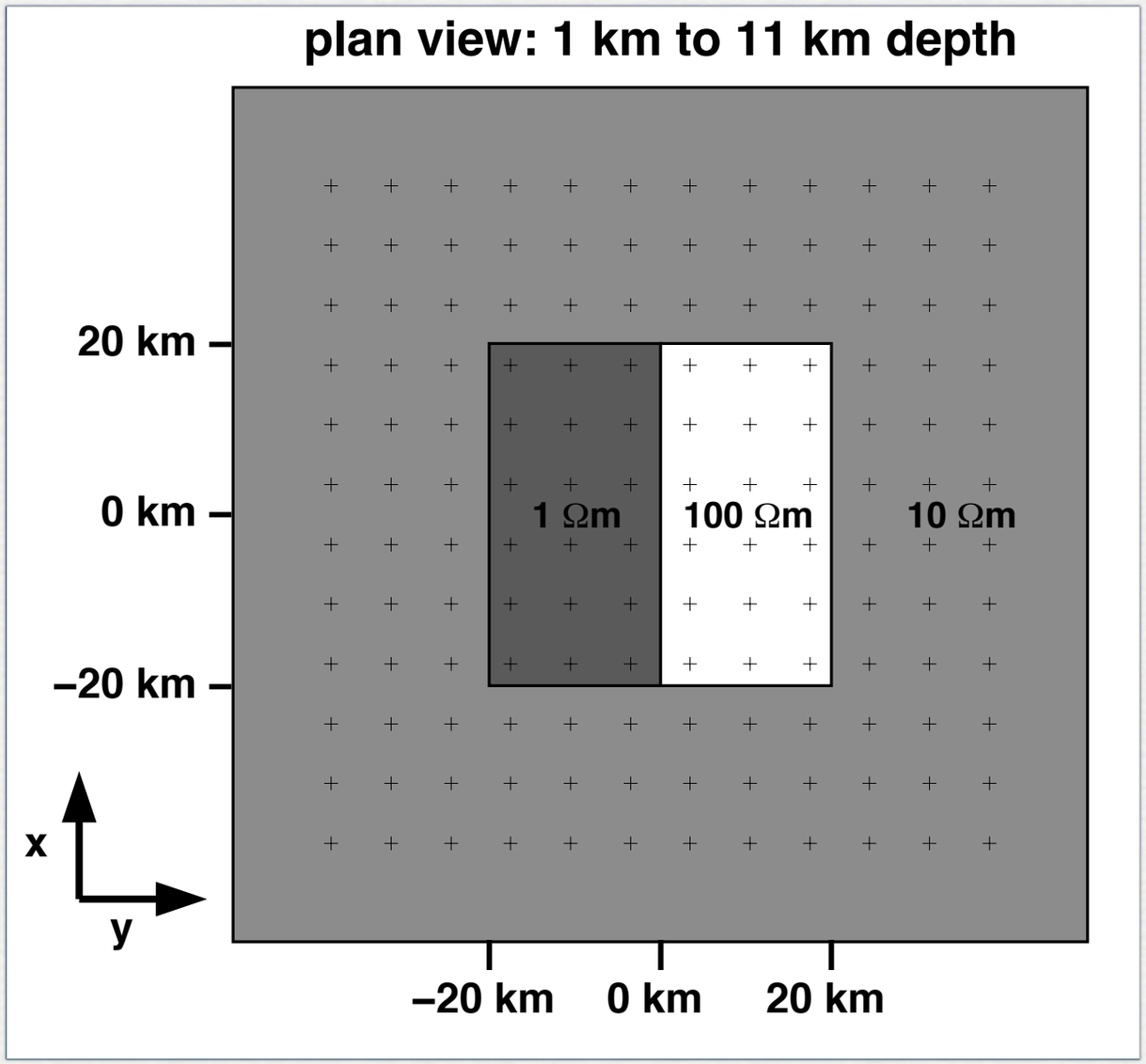
3D Resistivity Structure

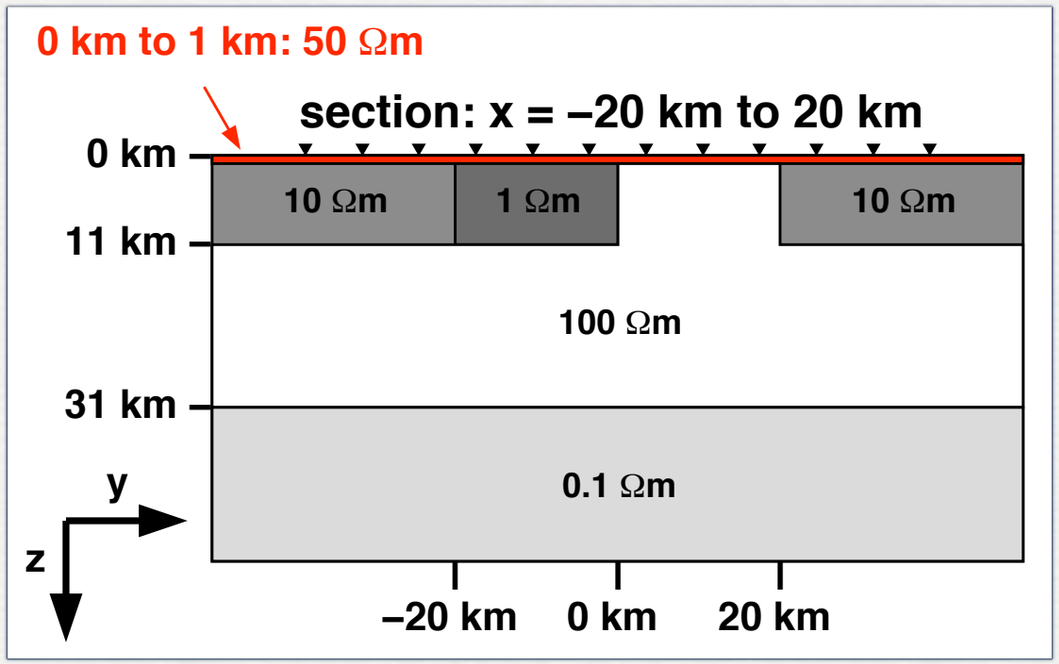
Well Known Structure

Often Used for Code Testing

Slightly Modified Version of The
COMMEMI 3D-2A Model by Zhdanov et al. 1997

3D Resistivity Structure





COMMEMI 3D-2A plus Additional 1 km Thick, 50 Ωm Cover Layer

To Avoid Problems and Effects of Outcropping Structure