Developing a seismic hazard model for Sabah, East Malaysia, using seismic and geodetic data

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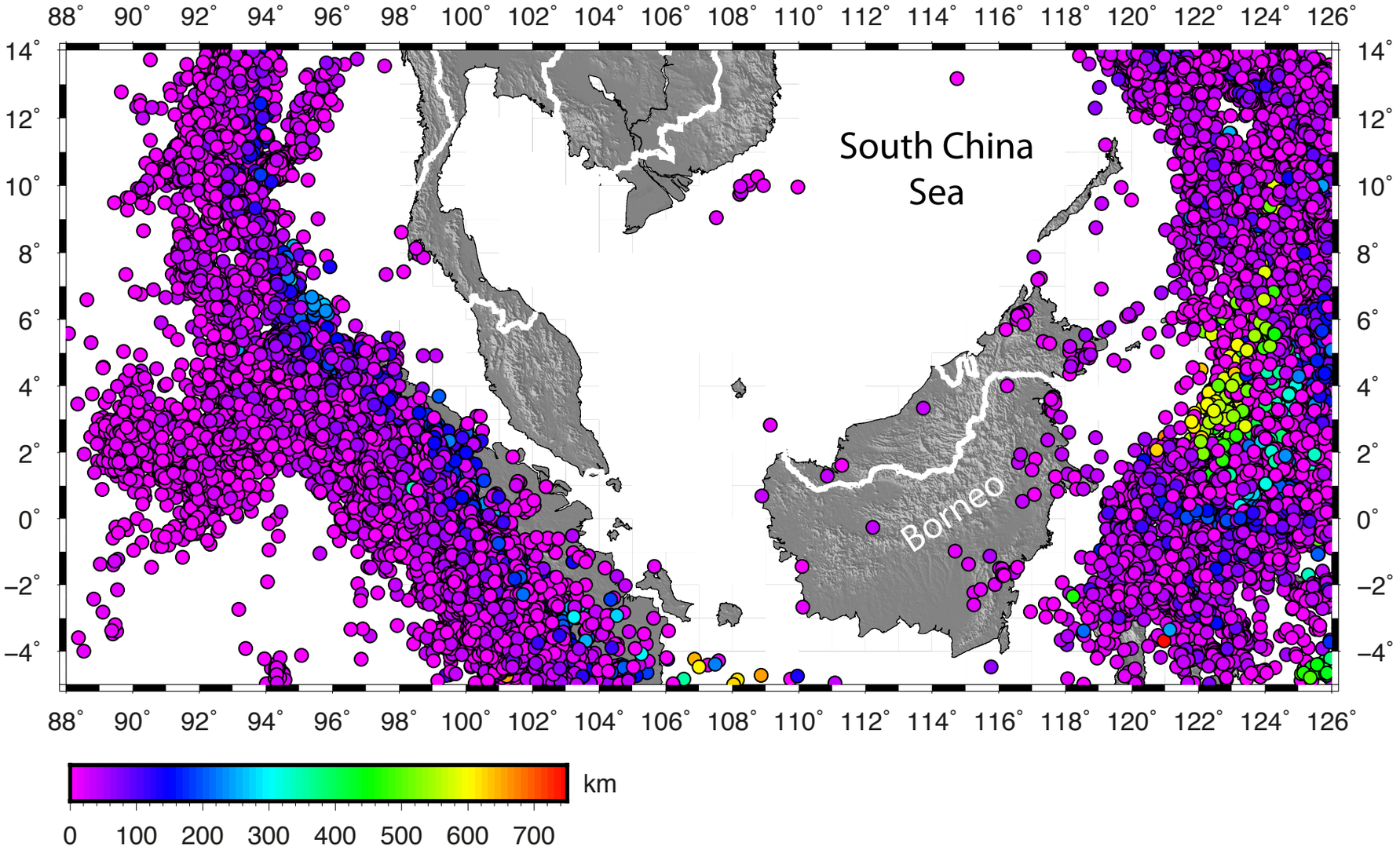
(1) University of Aberdeen, (2) University of Cambridge, (3) Universiti Malaysia Sabah



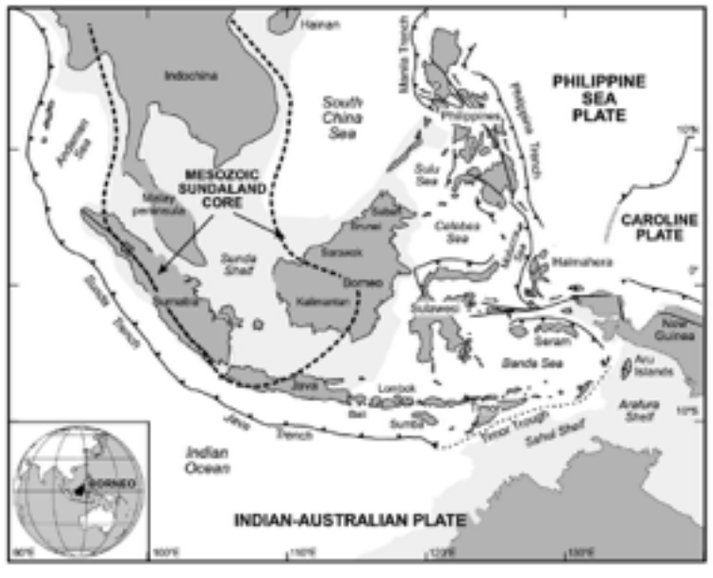
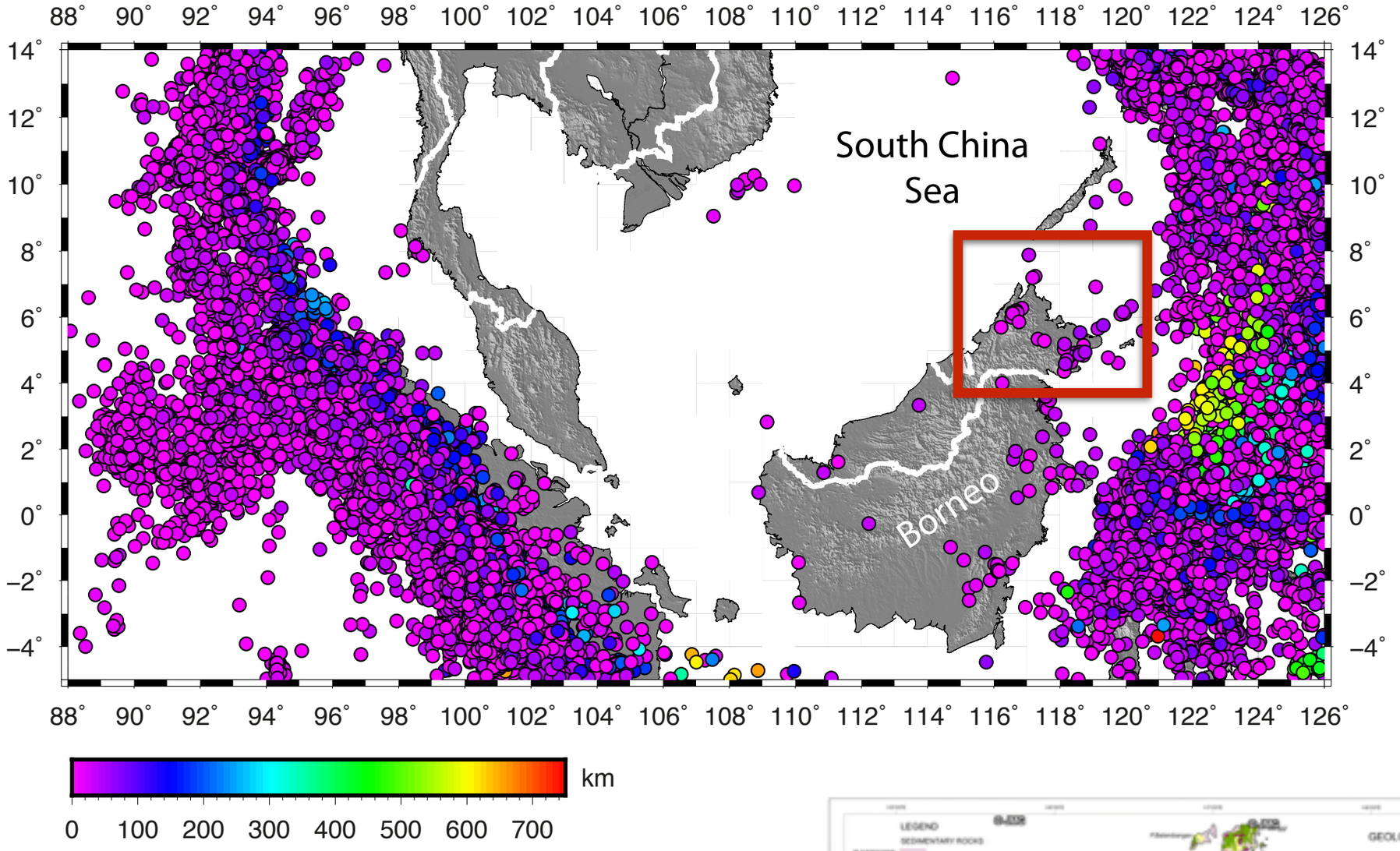
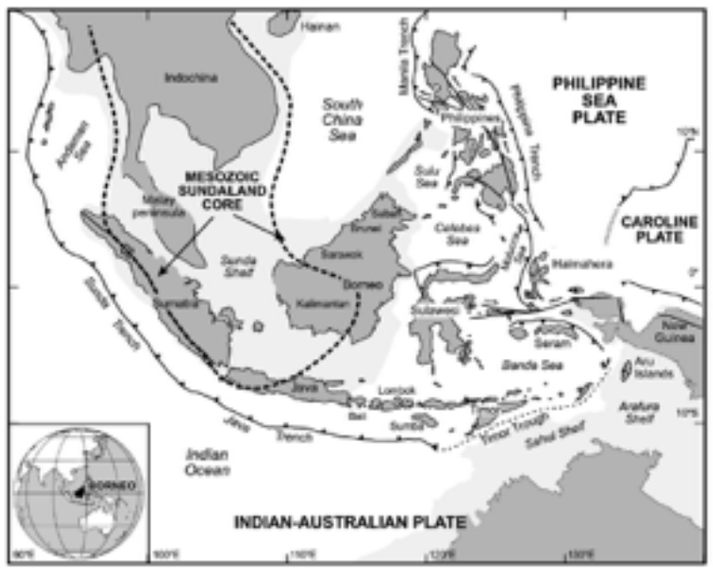


Fig. 2. Plate tectonic setting of Borneo and Sundaland.

Hall et al. (2008)





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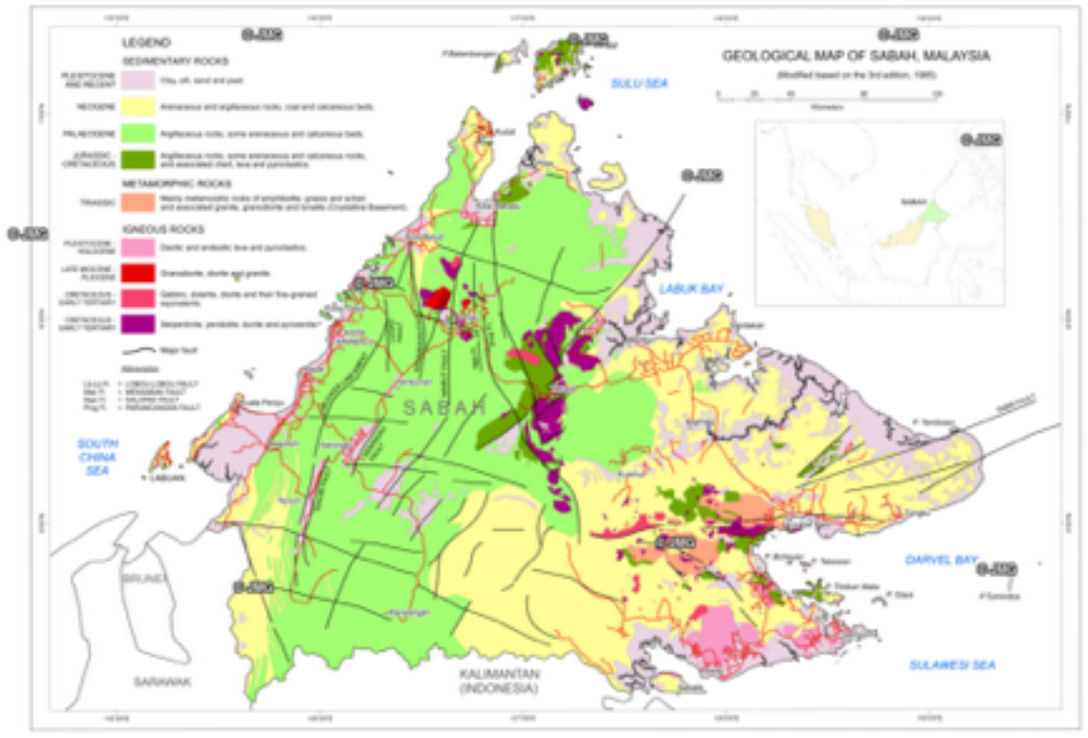
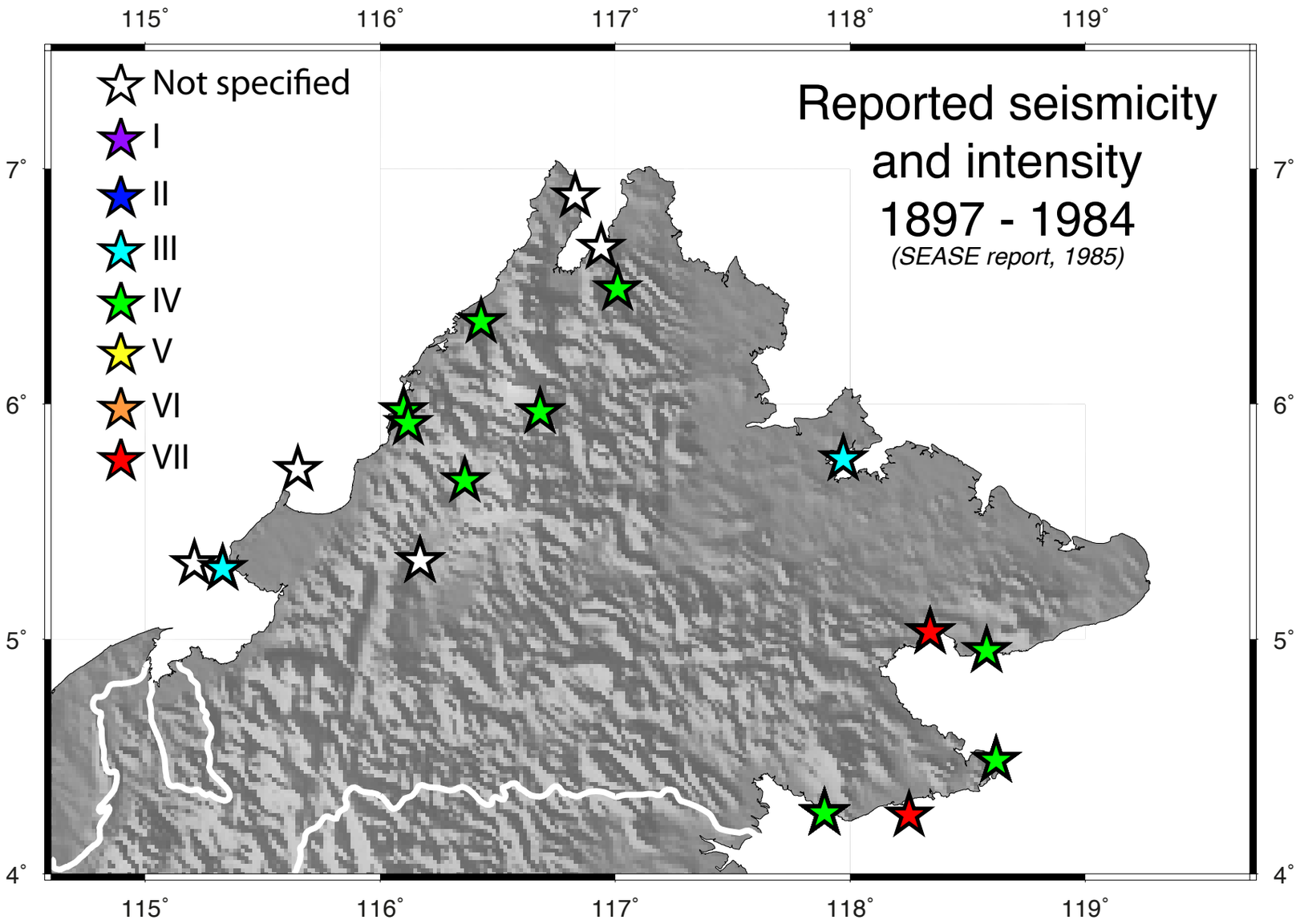


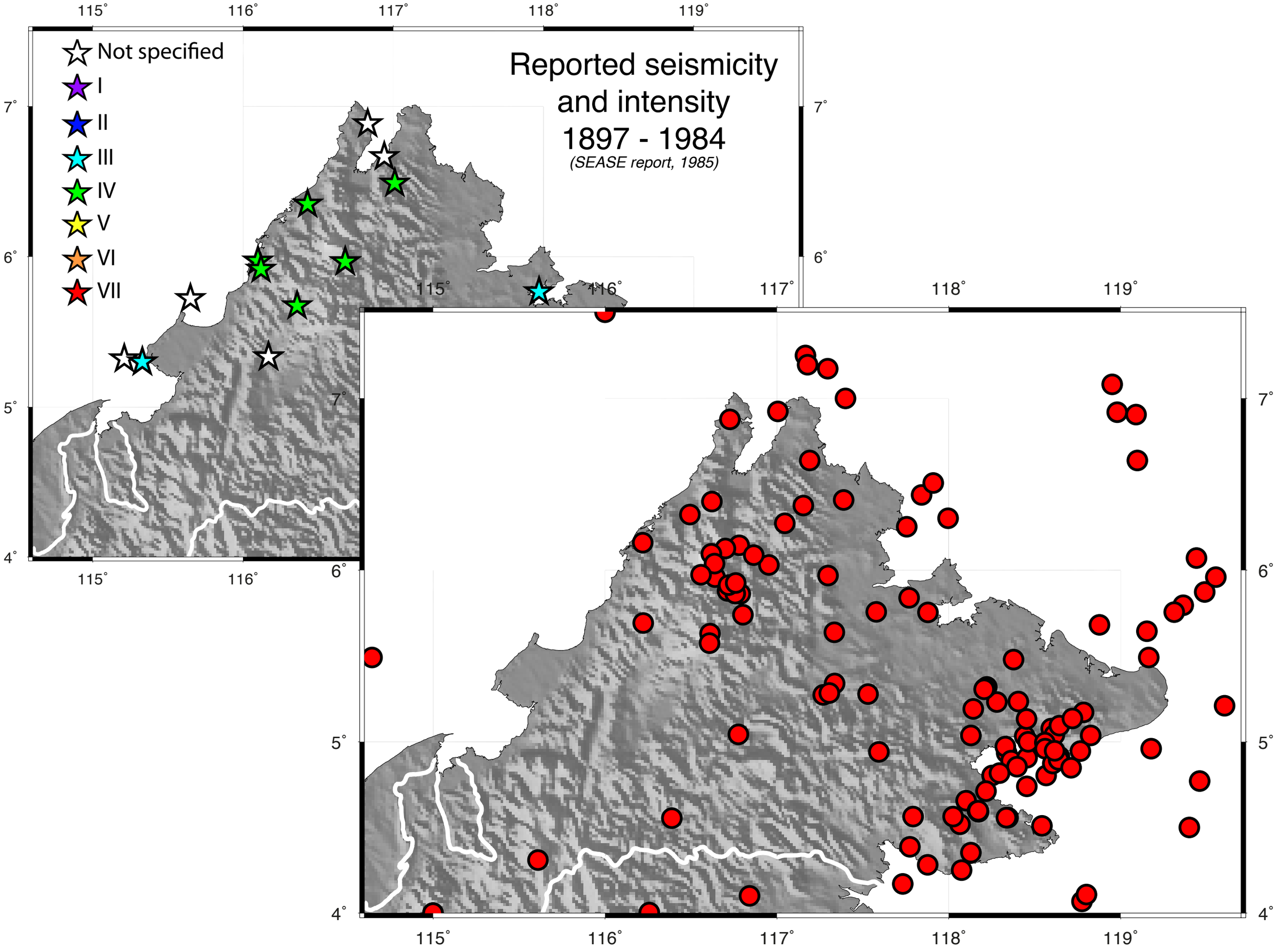
Minerals and Geoscience Department Malaysia (2012)


Not specified
I
II
III
IV
V
VI
VII
Reported seismicity
and intensity
1897 - 1984
(SEASE report, 1985)
115˚
116˚
117˚
118˚
119˚
7˚
6˚
5˚
4˚

Reported seismicity and intensity 1897 - 1984

(SEASE report, 1985)

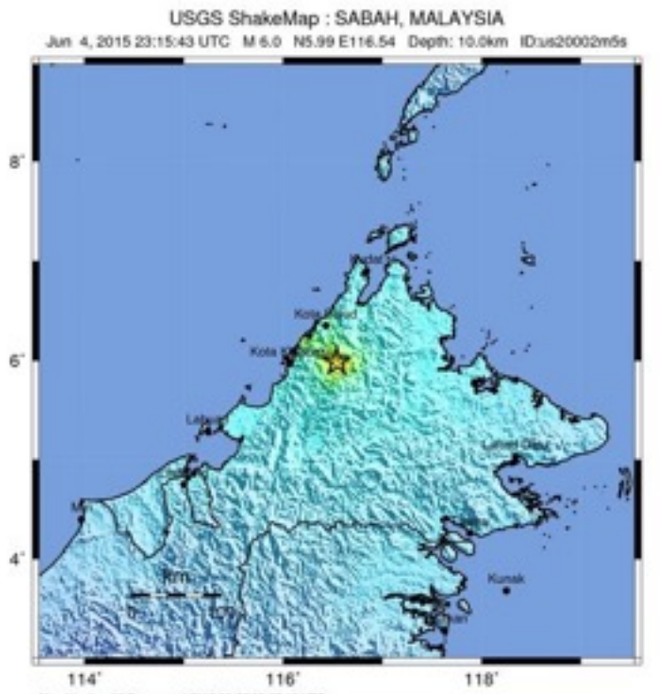
- Not specified
- I
- II
- III
- IV
- V
- VI
- VII



June 2015 M6.0 Ranau earthquake

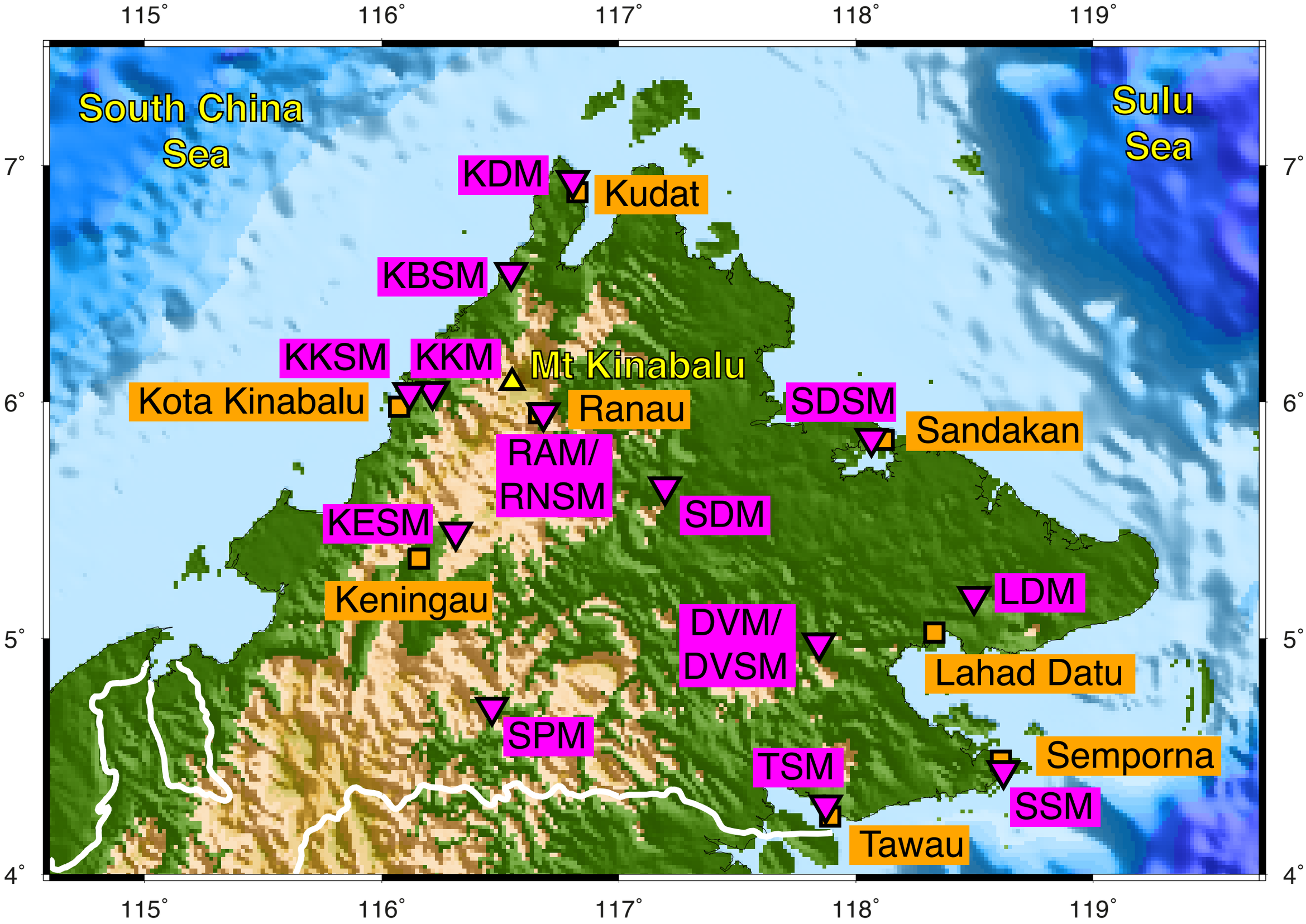
Western Slope of Mount Kinabalu

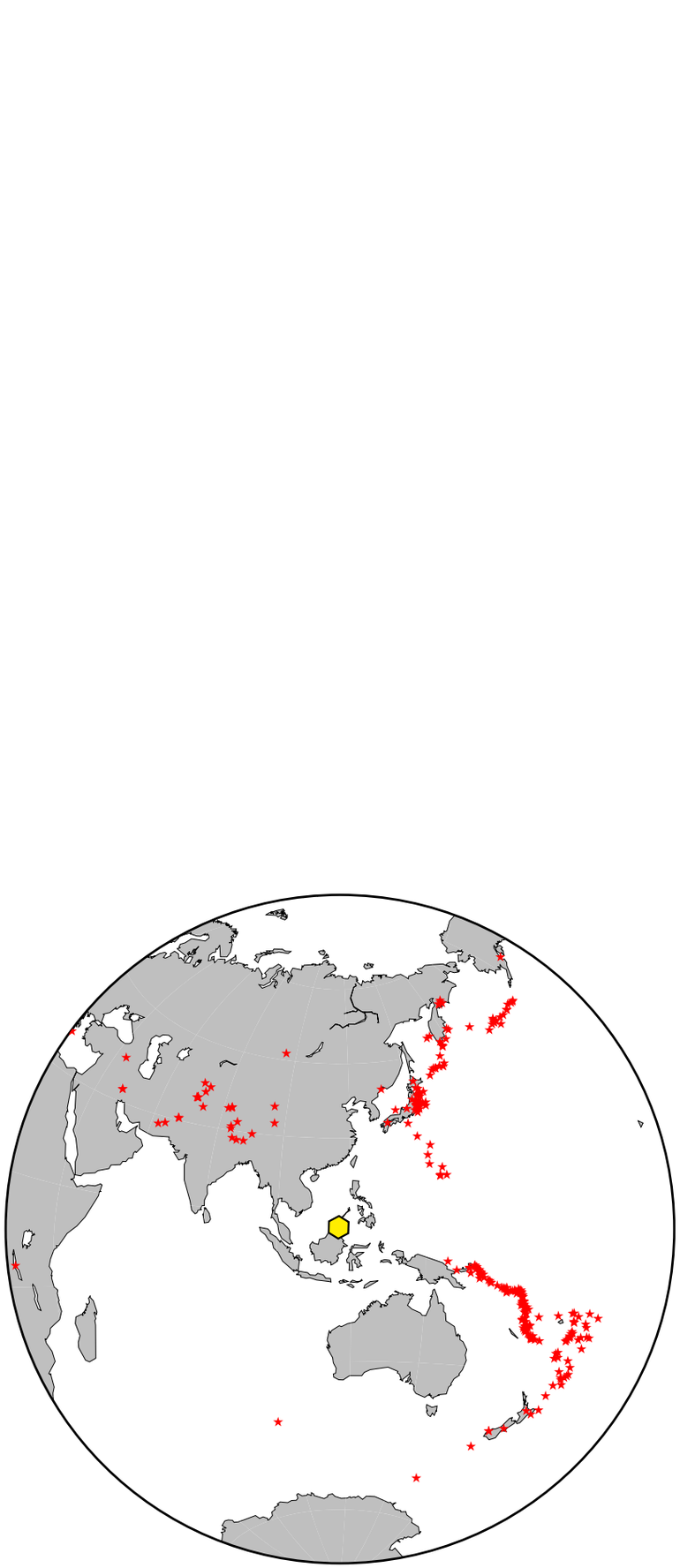
Sg. Mesilou, Ranau

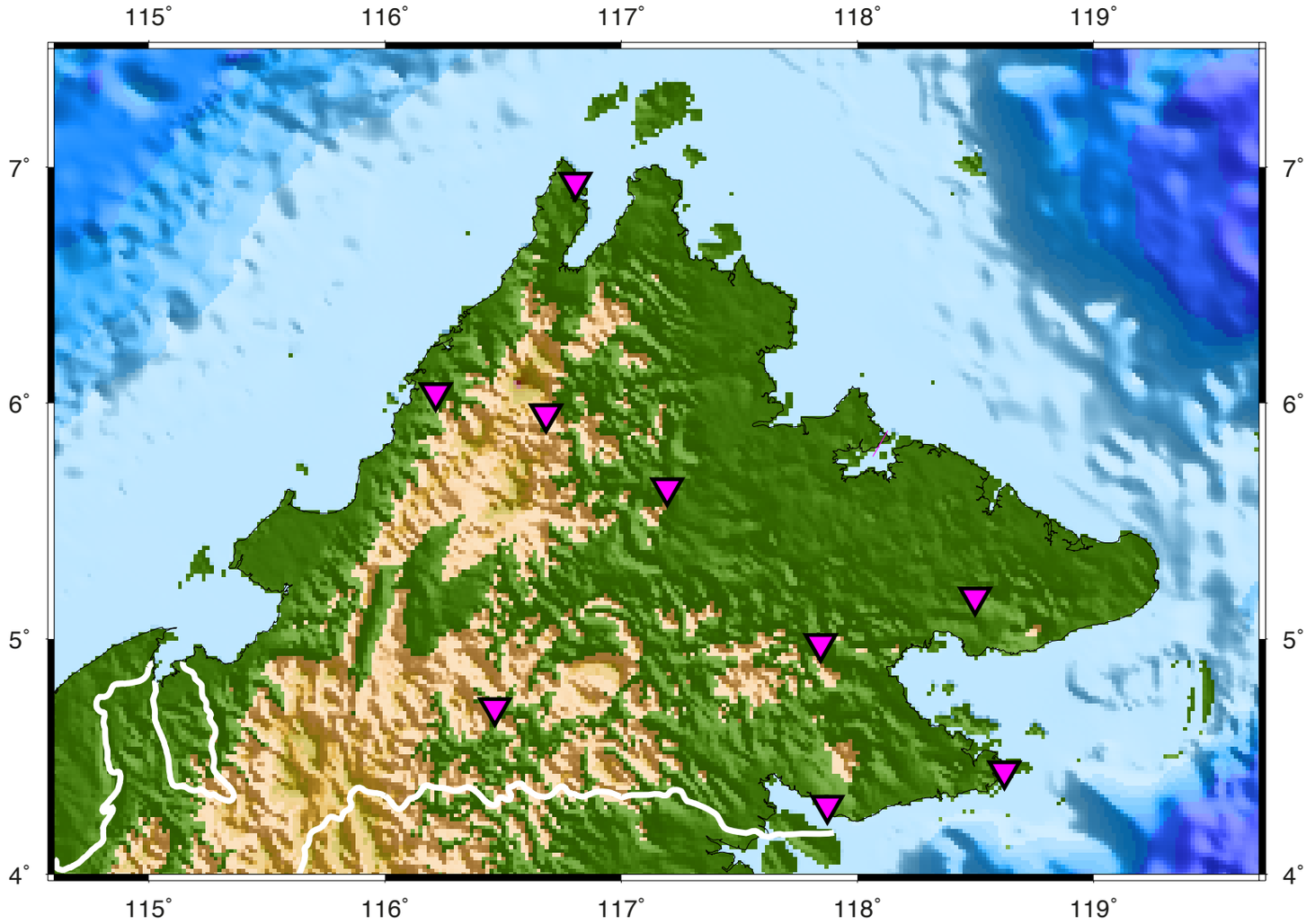


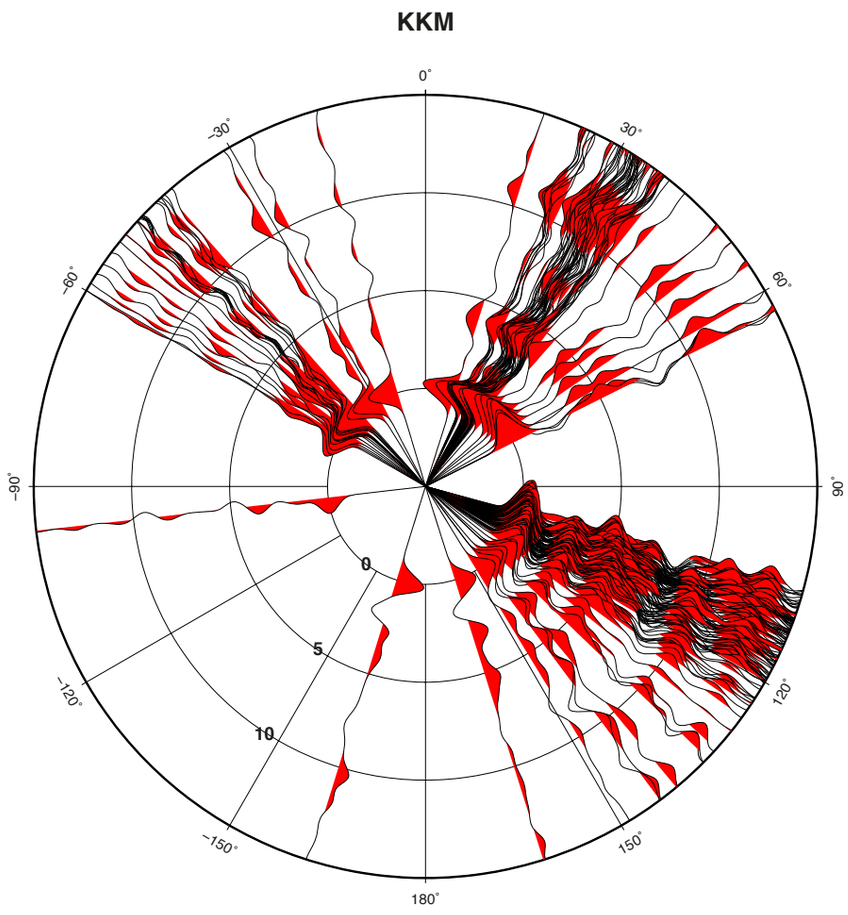
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	*<0.02*	*0.1*	*1.4*	*4.7*	*9.6*	*20*	*41*	*86*	*>178*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

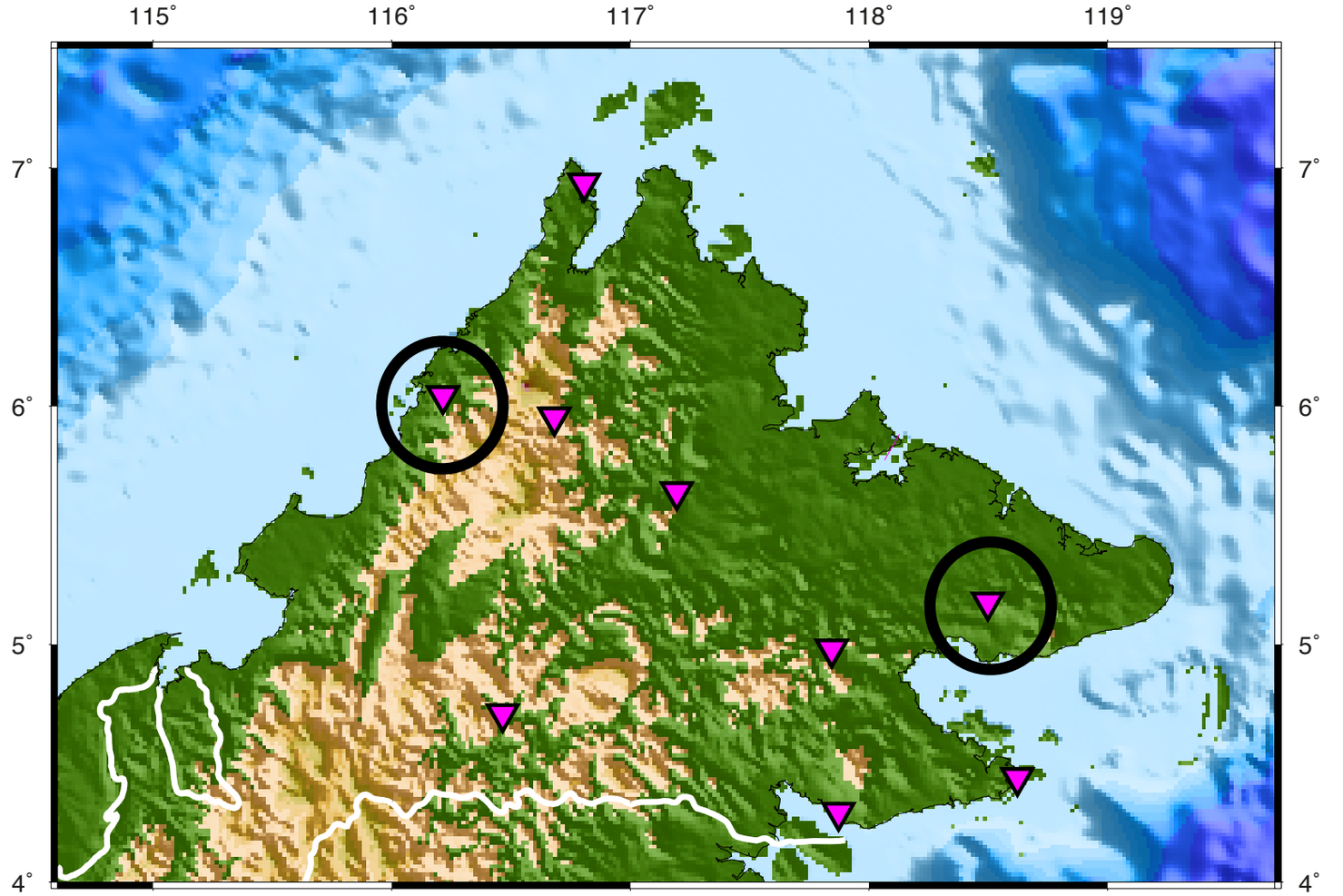
Scale based upon Worden et al. (2012)

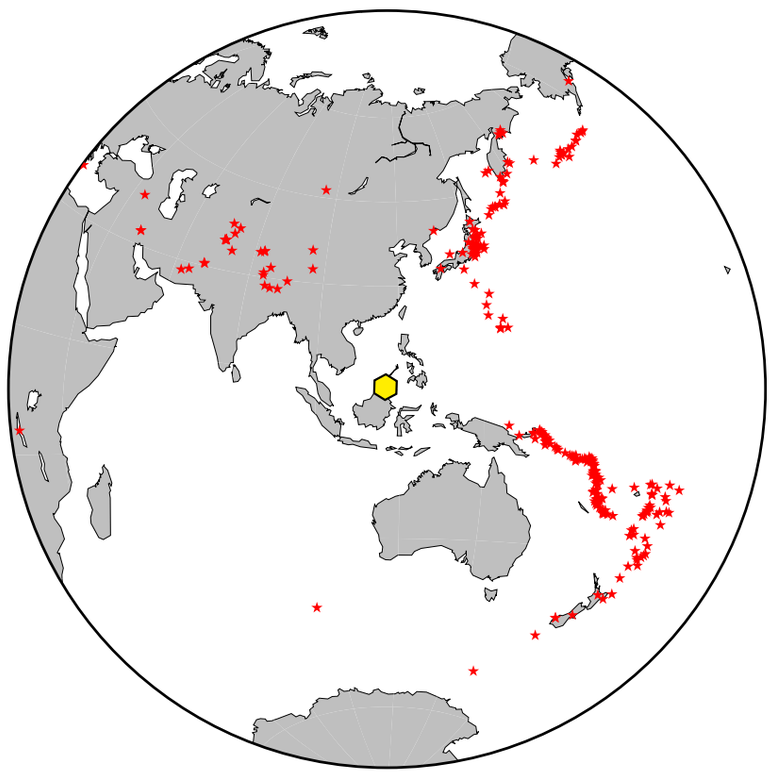

115°
116°
117°
118°
119°
7°
6°
5°
4°
South China Sea
Sulu Sea
KDM
Kudat
KBSM
KKSM
KKM
Mt Kinabalu
Kota Kinabalu
Ranau
SDSM
Sandakan
RAM/
RNSM
SDM
KESM
Keningau
LDM
DVM/
DVSM
Lahad Datu
SPM
Semporna
TSM
SSM
Tawau

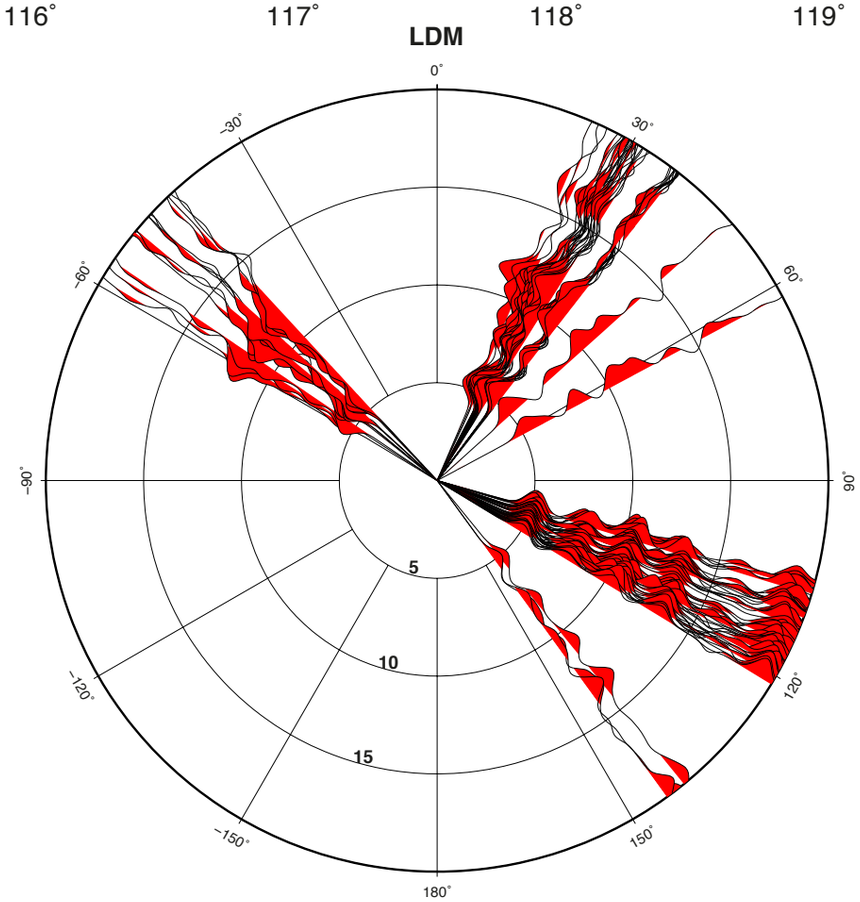


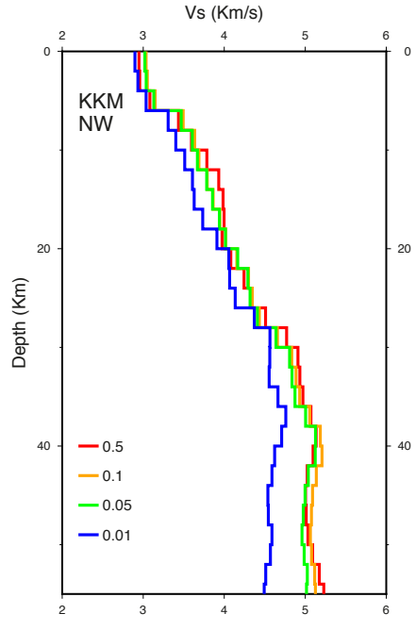

115˚
116˚
117˚
118˚
119˚
7˚
6˚
5˚
4˚

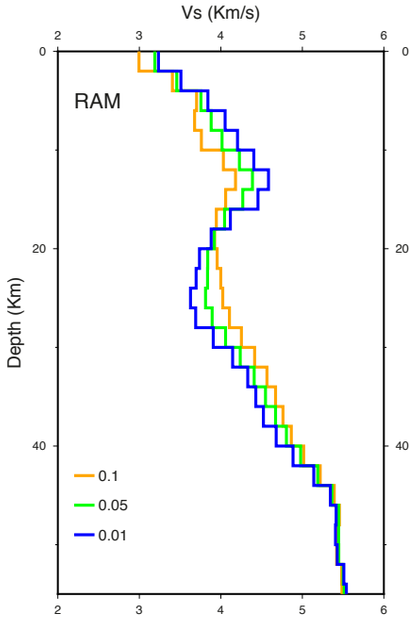

KKM
0°
30°
60°
90°
120°
150°
180°
-30°
-60°
-90°
-120°-150°
0
5
10


115°
116°
117°
118°
119°
7°
6°
5°
4°




LDM
0°
30°
60°
90°
120°
150°
180°
-30°
-60°
-90°
-120°
-150°
5
10
15


Vs (Km/s)
KKM
NW
Depth (Km)
0.5
0.1
0.05
0.01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RAM
Depth (Km)
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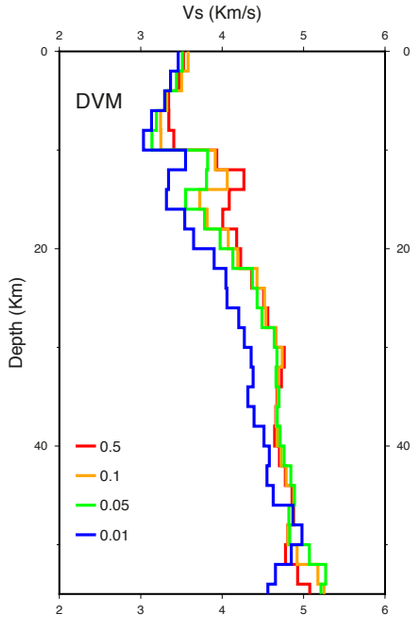
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DVM
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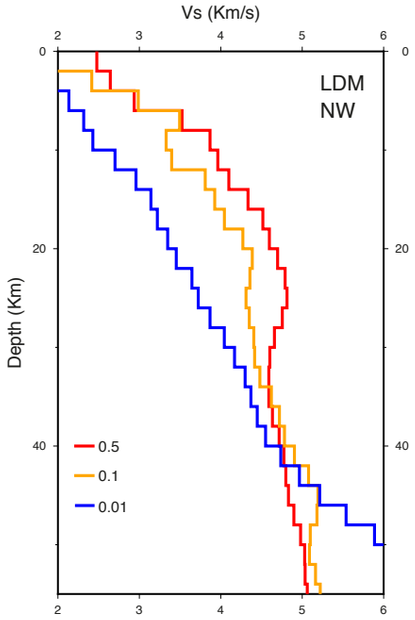
Vs (Km/s)
LDM
NW
Depth (Km)
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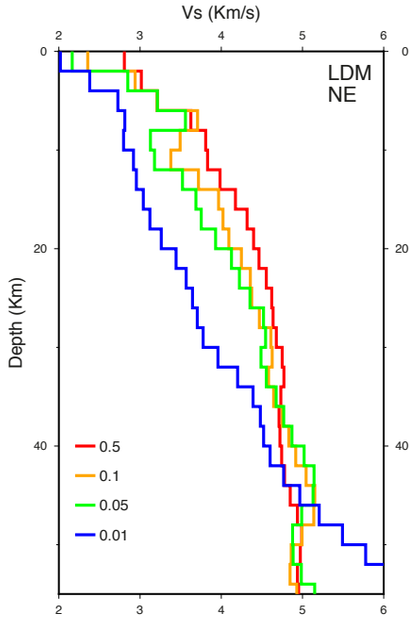
0.1
0.01


Vs (Km/s)
LDM
NE
Depth (Km)
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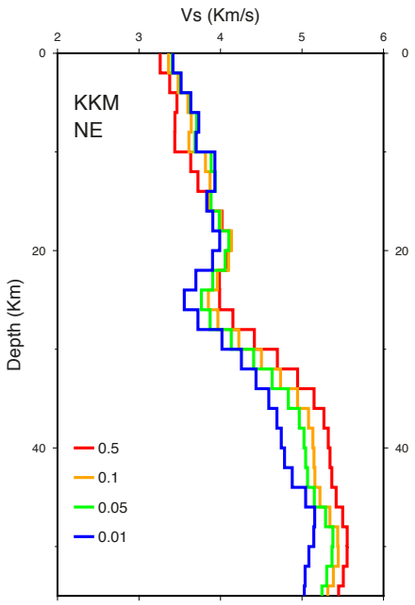
0.1
0.05
0.01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NE
Depth (Km)
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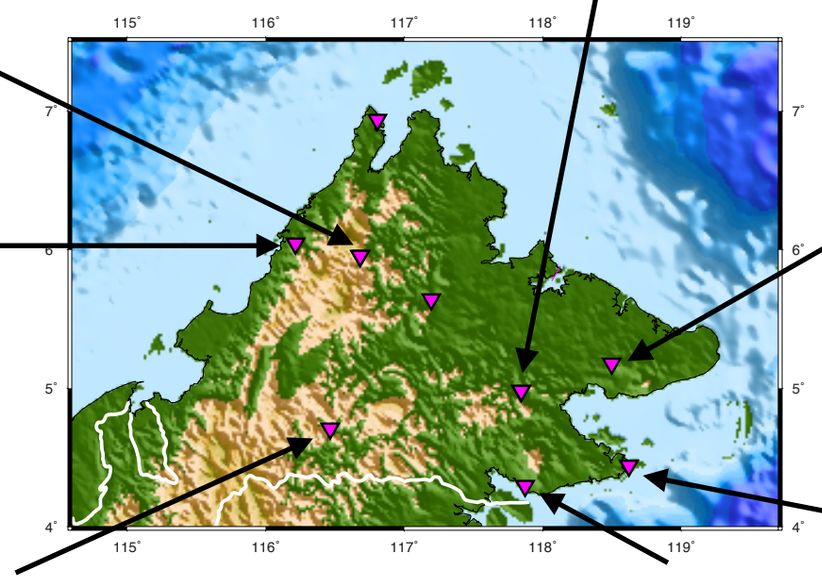
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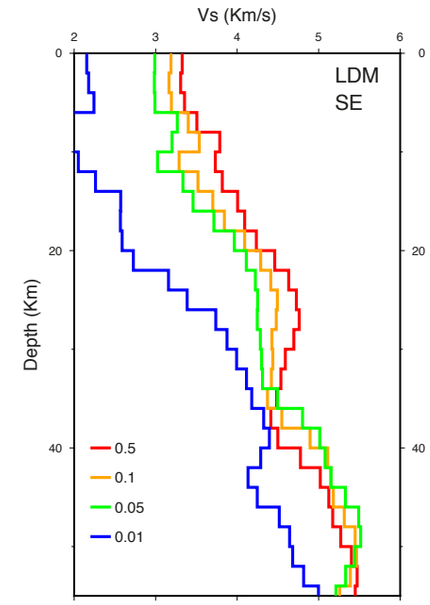
Vs (Km/s)
LDM
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Depth (Km)
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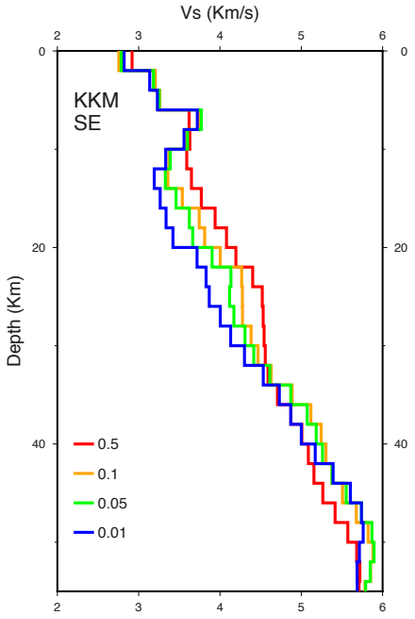
Vs (Km/s)
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SE
Depth (Km)
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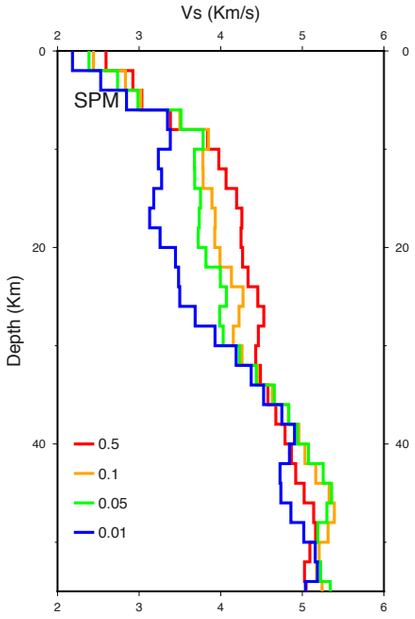
Vs (Km/s)
SPM
Depth (Km)
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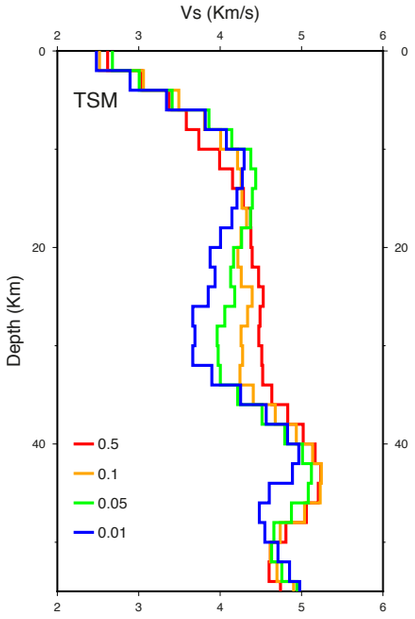
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TSM
Depth (Km)
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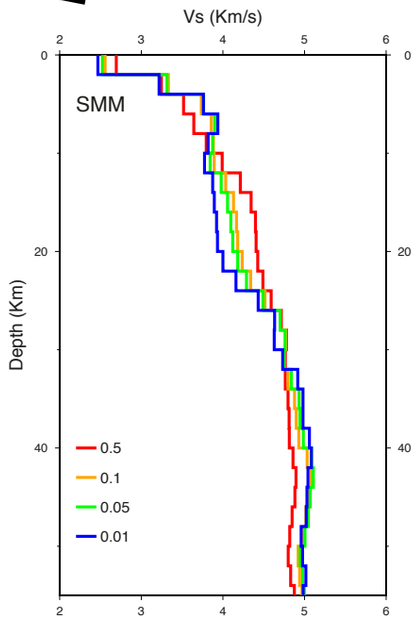
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Depth (Km)
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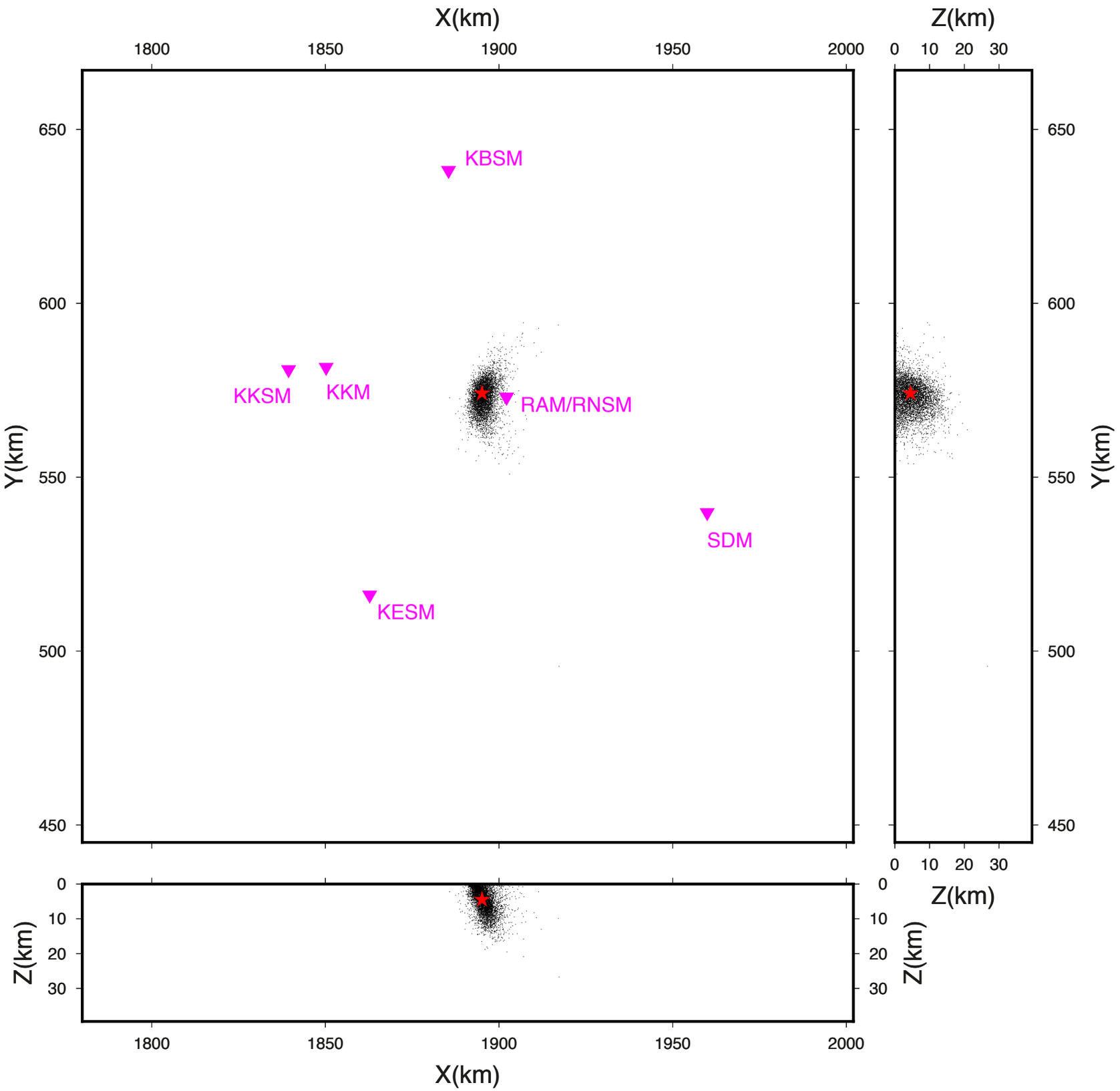
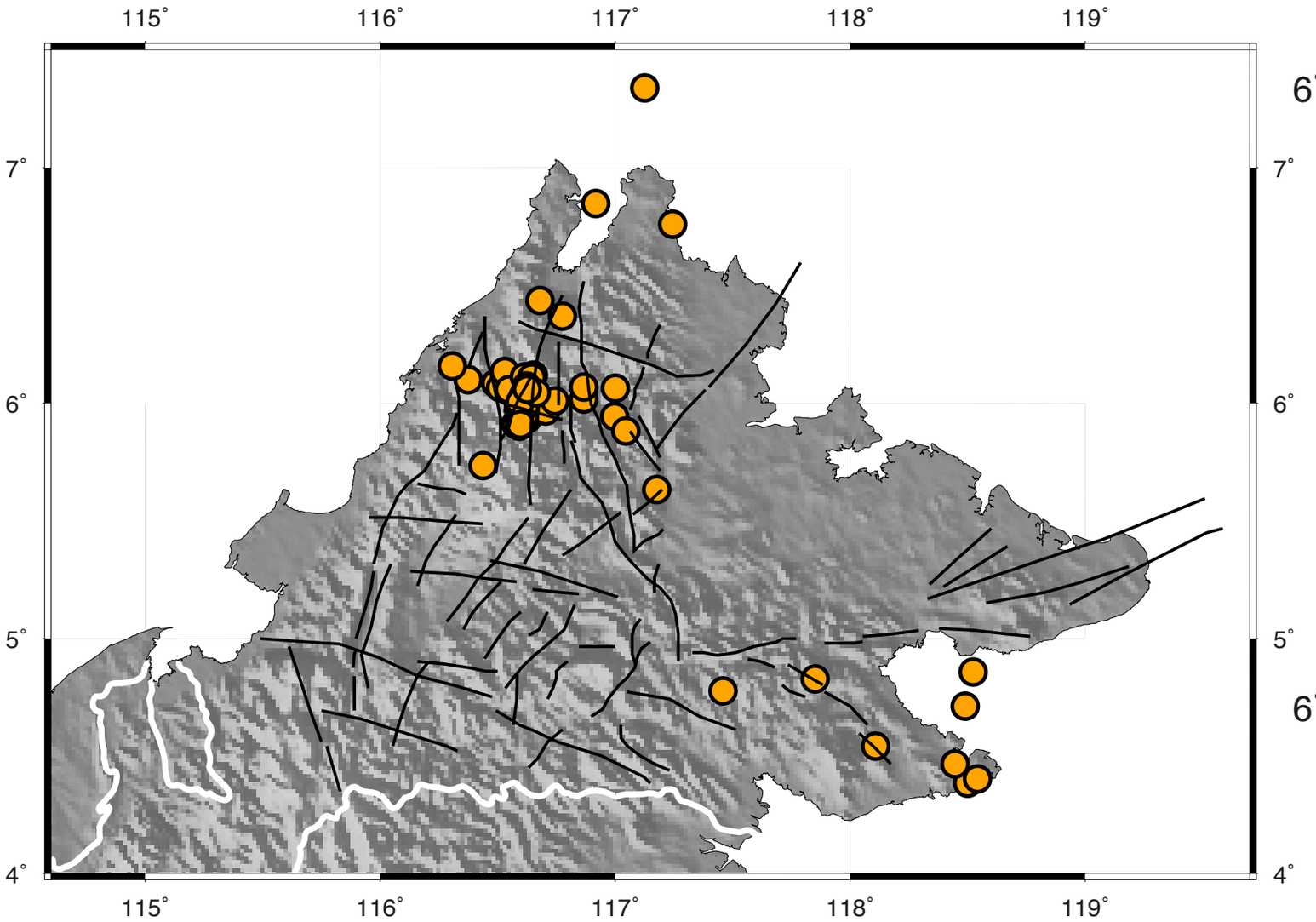
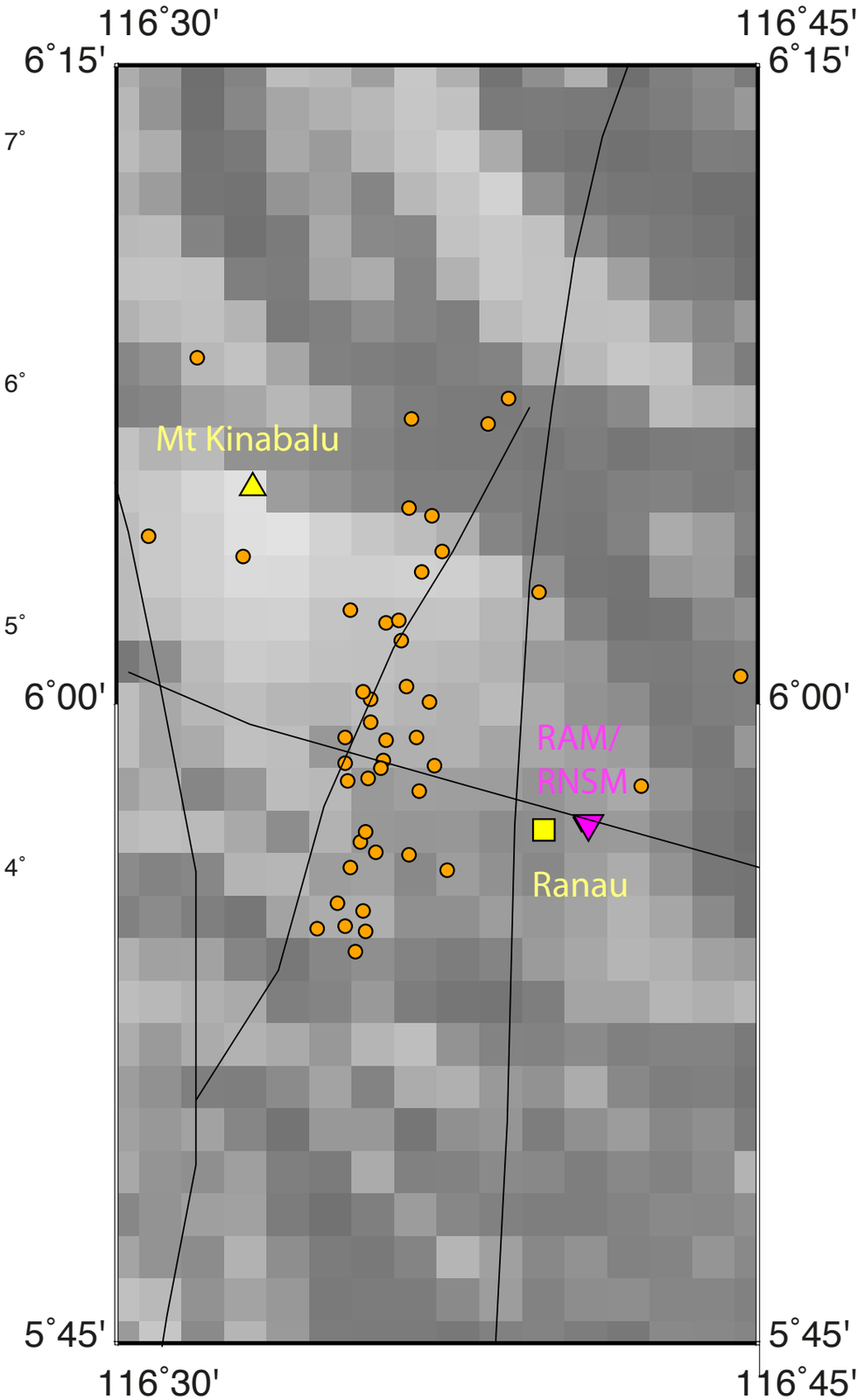


Use NonLinLoc (Lomax, 2001) to locate events where there were 4 or more arrivals that could be clearly picked.





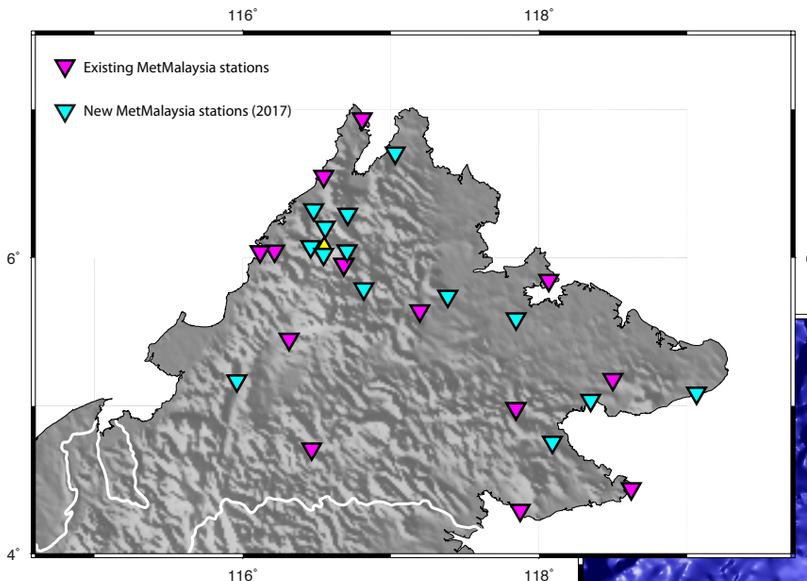
Locate 68 events using data from 2005-2016. 57 from around Ranau.

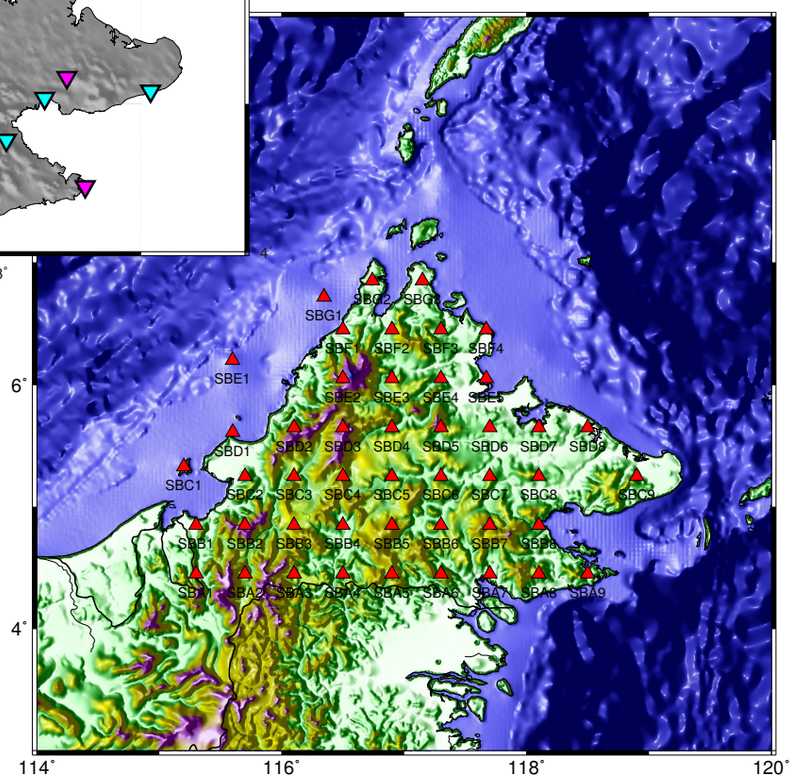
Improving the velocity model and earthquake locations

Relating seismicity to faults and tectonics

Improving the velocity model and earthquake locations

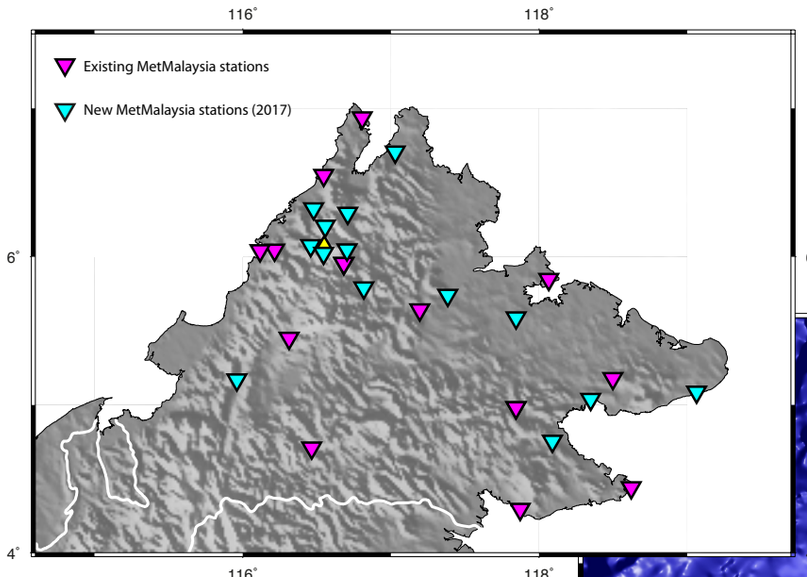
Relating seismicity to faults and tectonics

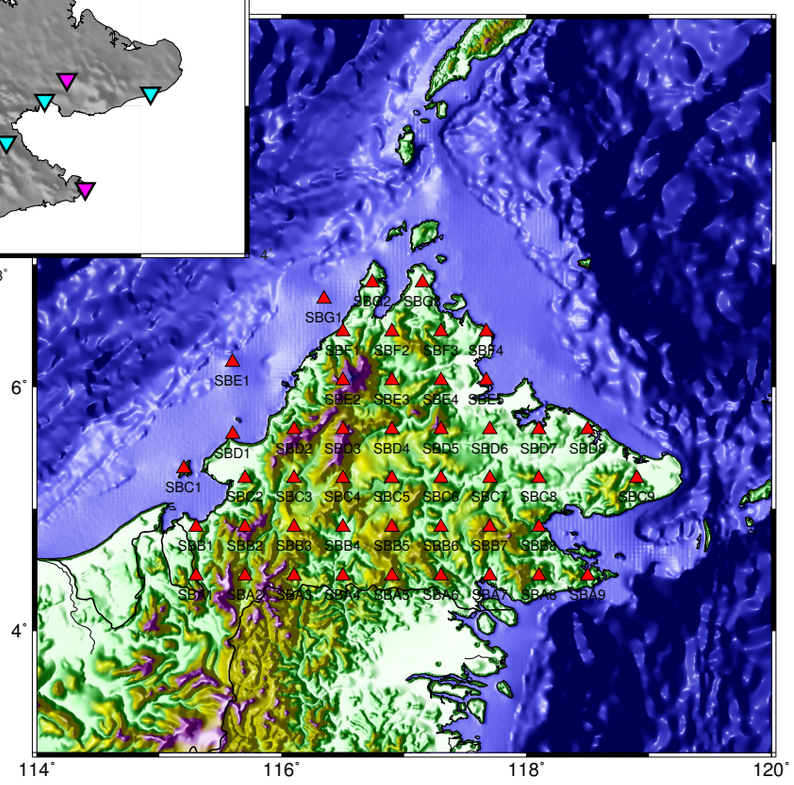




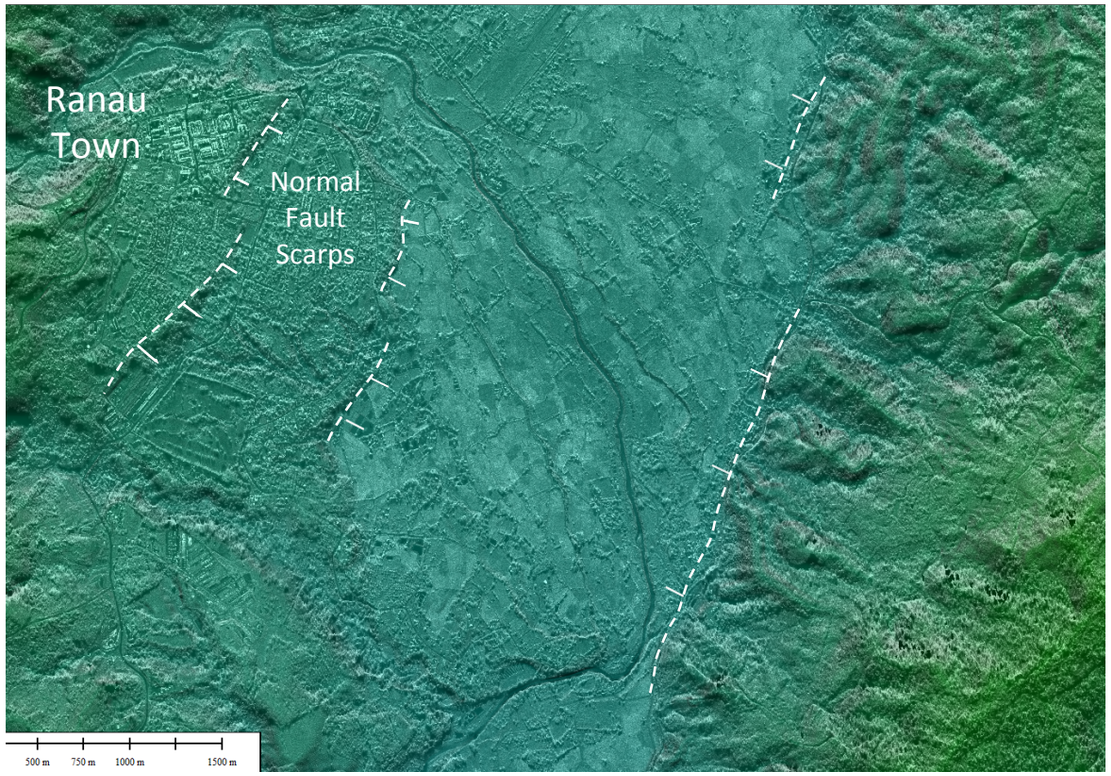
Improving the velocity model and earthquake locations

Relating seismicity to faults and tectonics

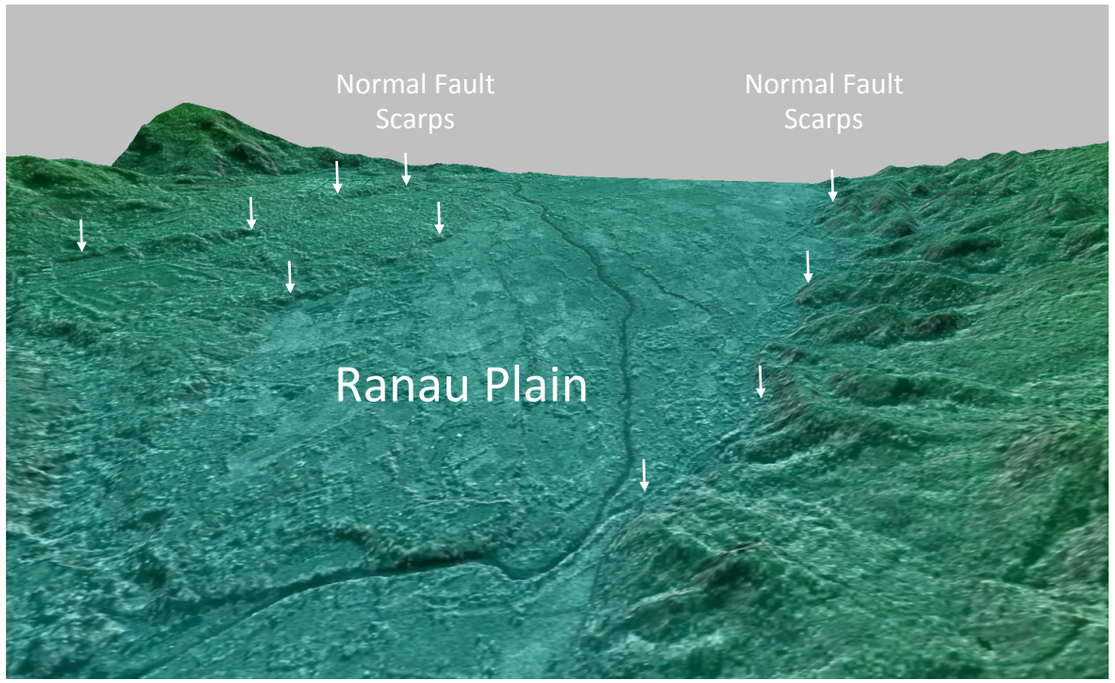




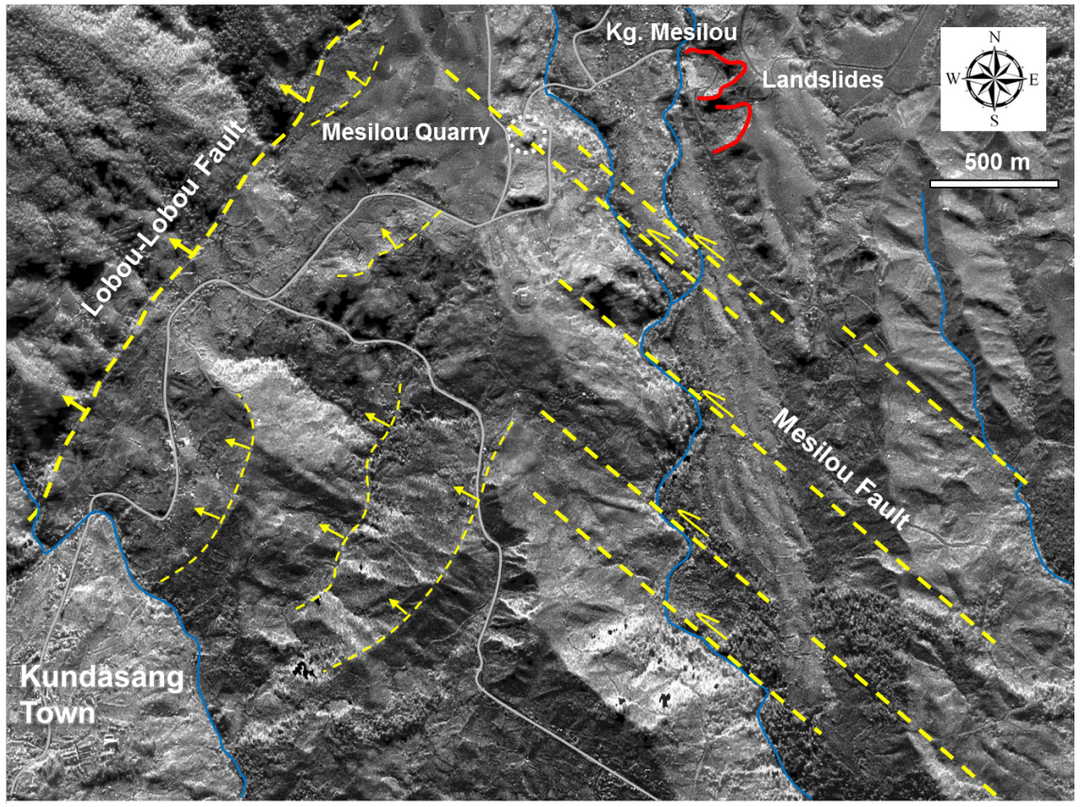
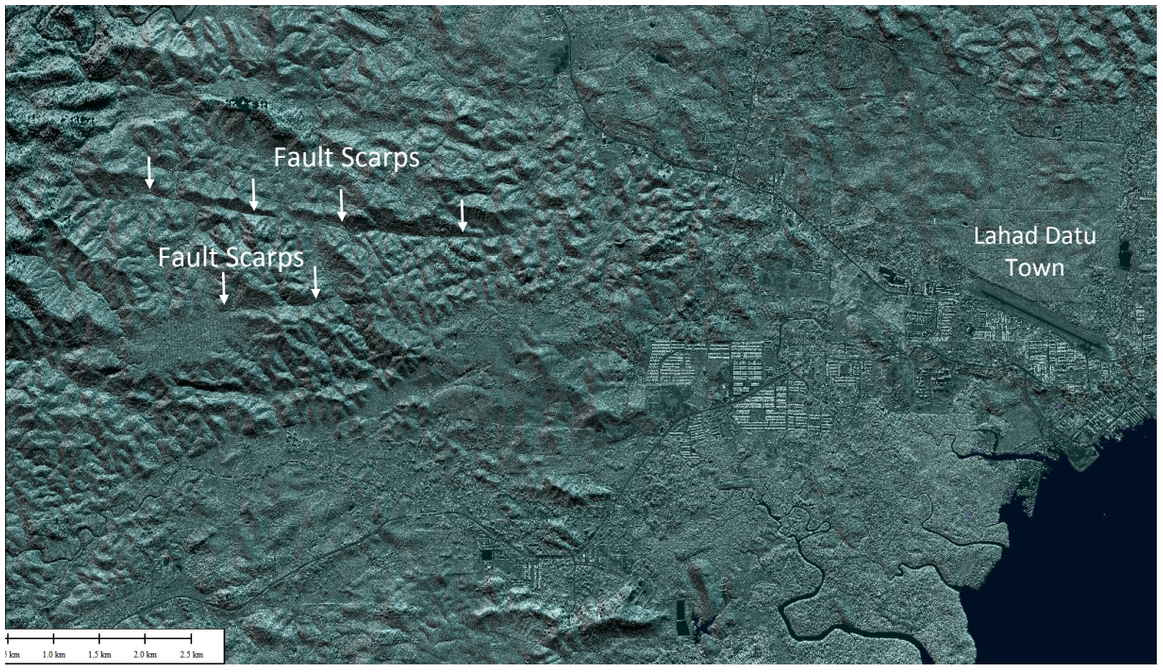
IFSAR IMAGE OF RANAU PLAIN



3D IMAGE OF RANAU PLAIN



Potential Active Faults Based IFSAR Data



IFSAR IMAGE OF LAHAD DATU