

Comparison of 3D forward responses

The MT 3D inversion workshop test model

designed by Marion Miensopust, Pilar Queralt and Alan Jones

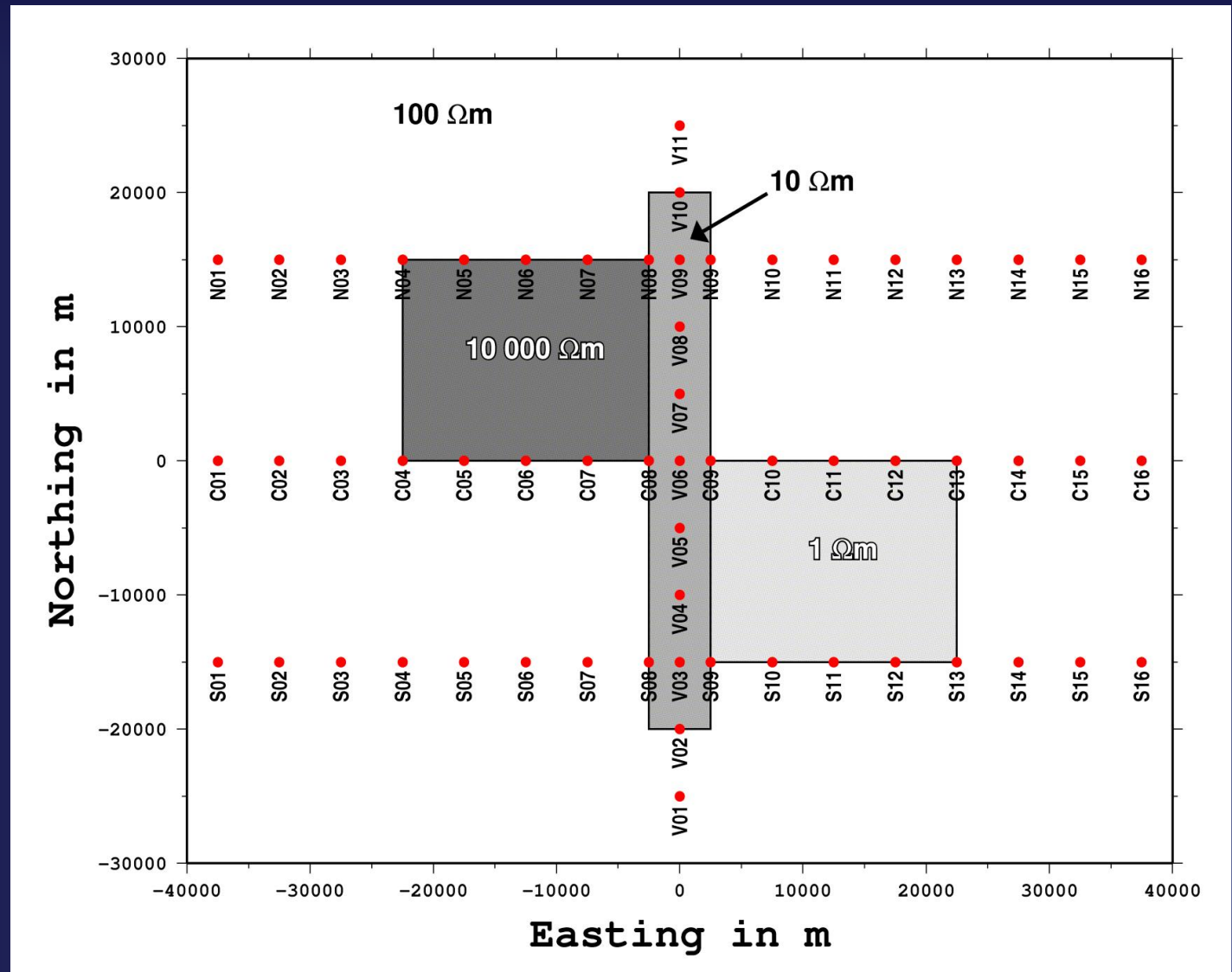
Site locations

59 sites

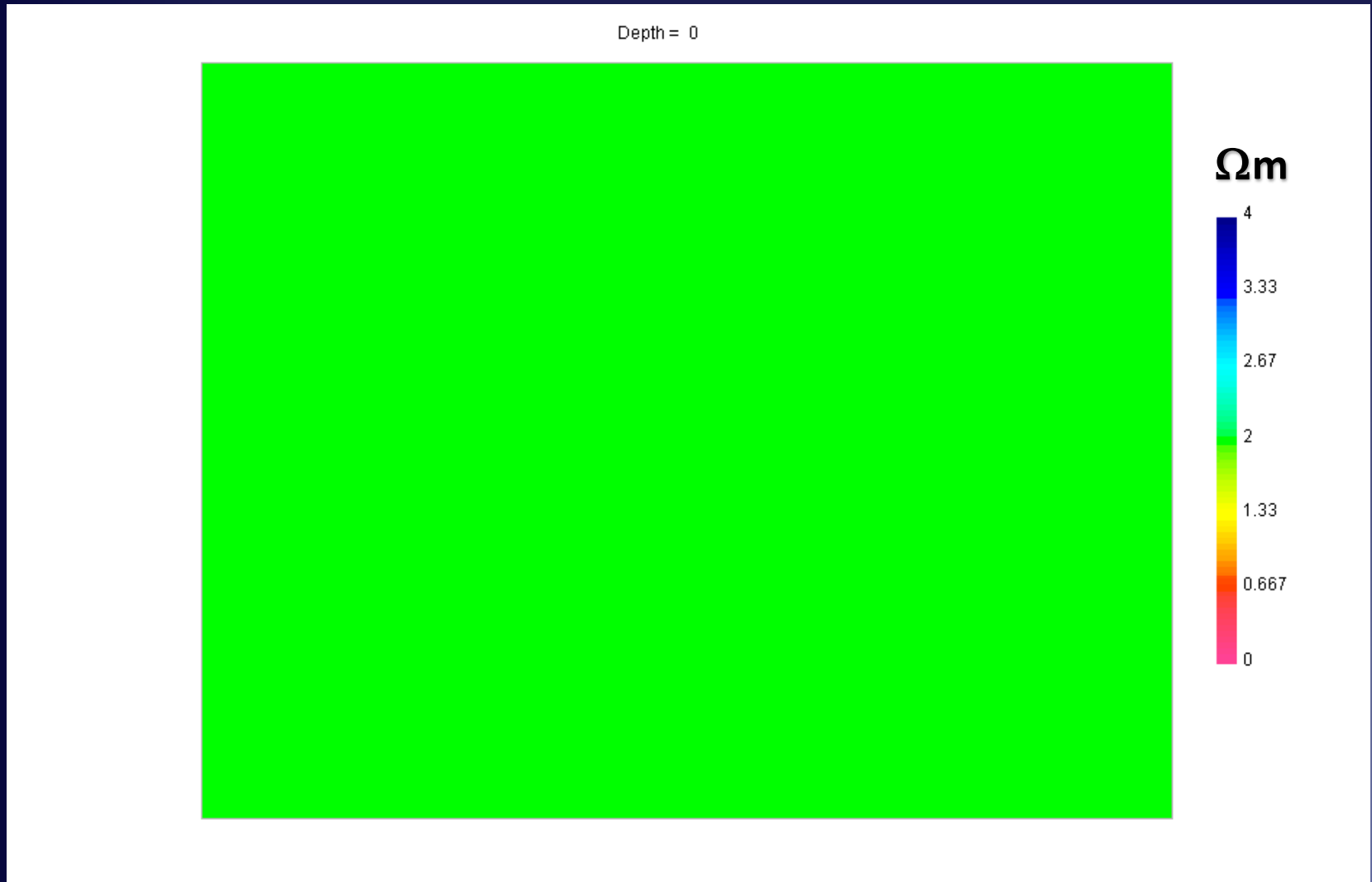
21 periods

4 periods per decade

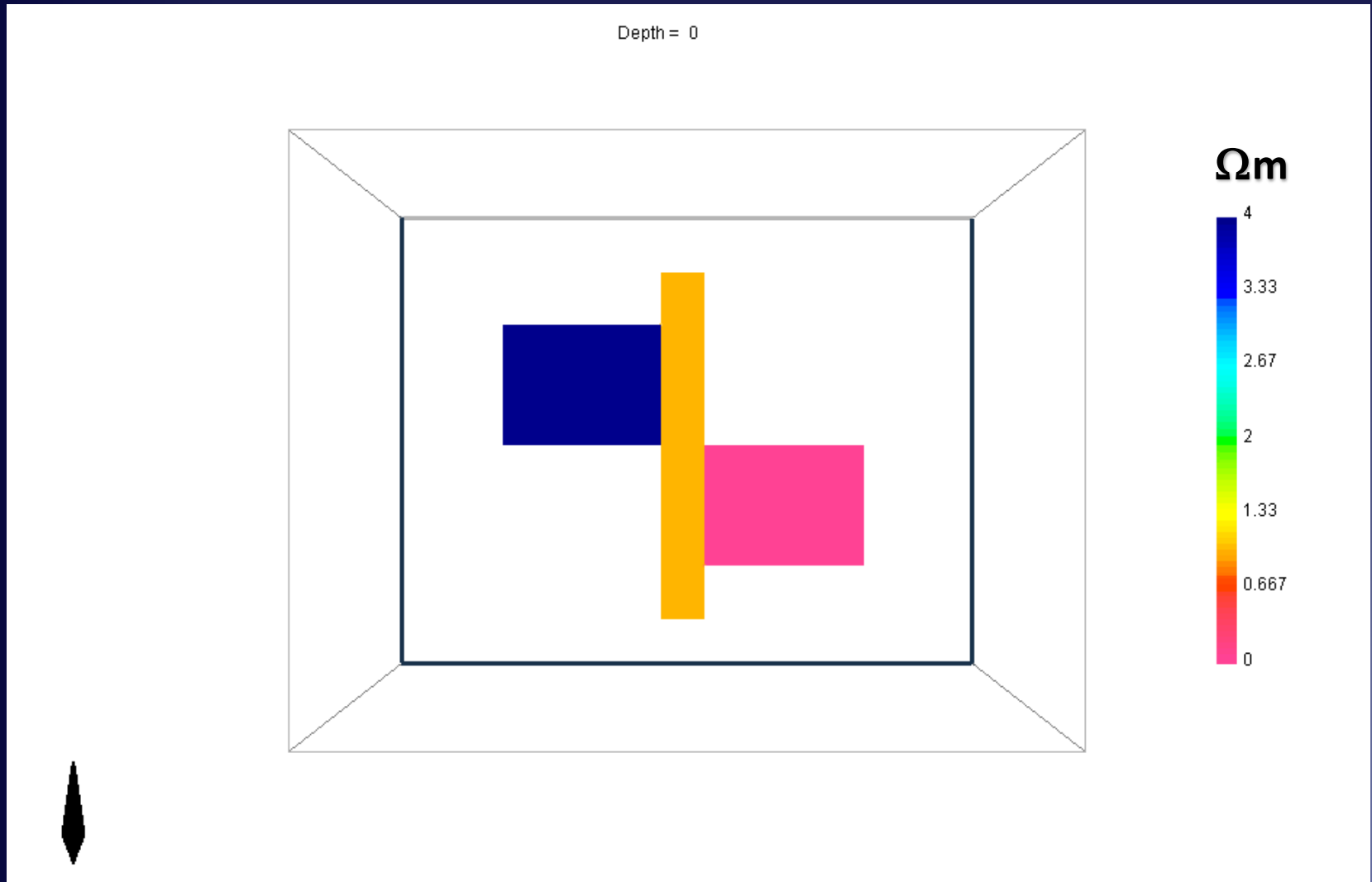
0.1 s – 10000 s



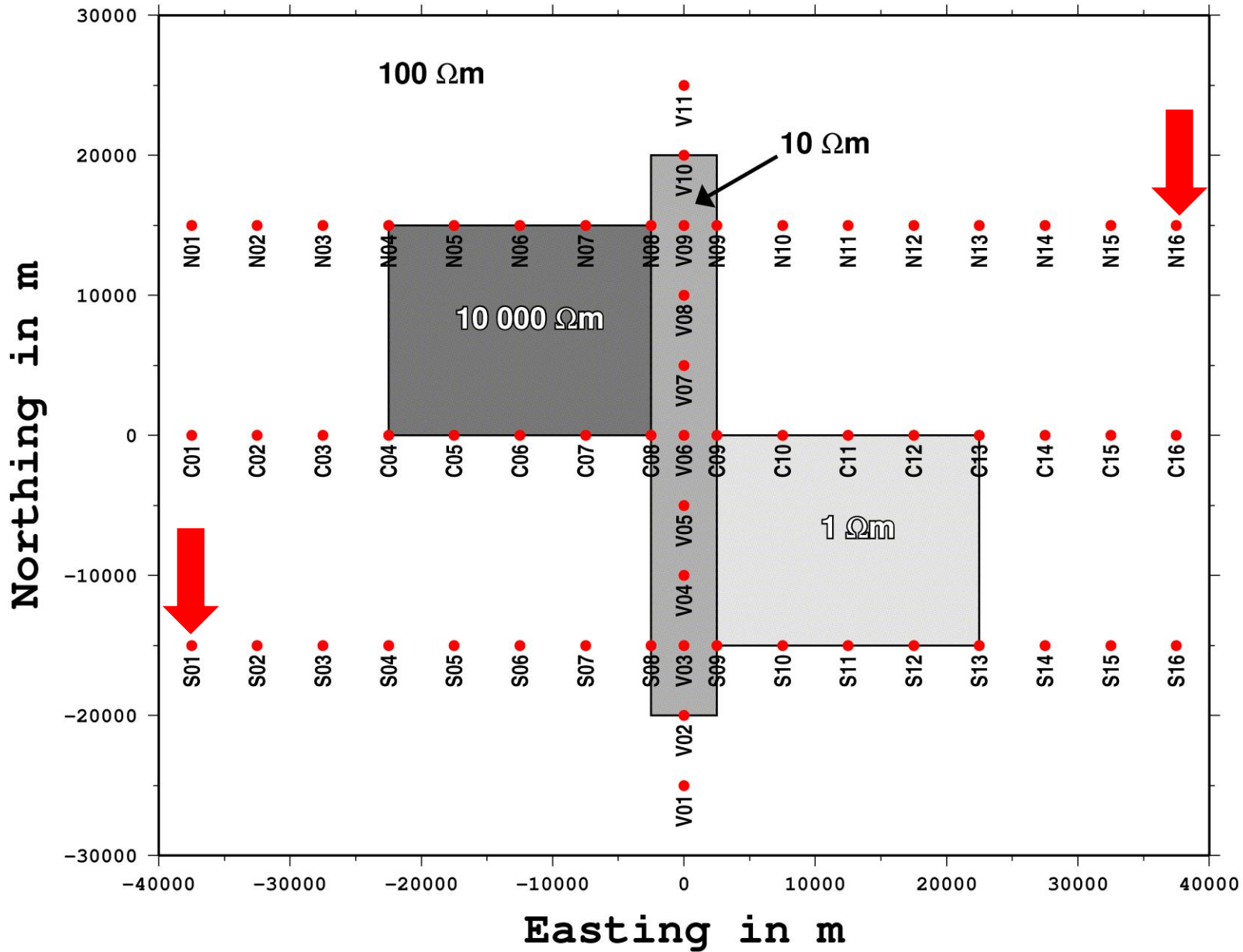
Forward model



Forward model

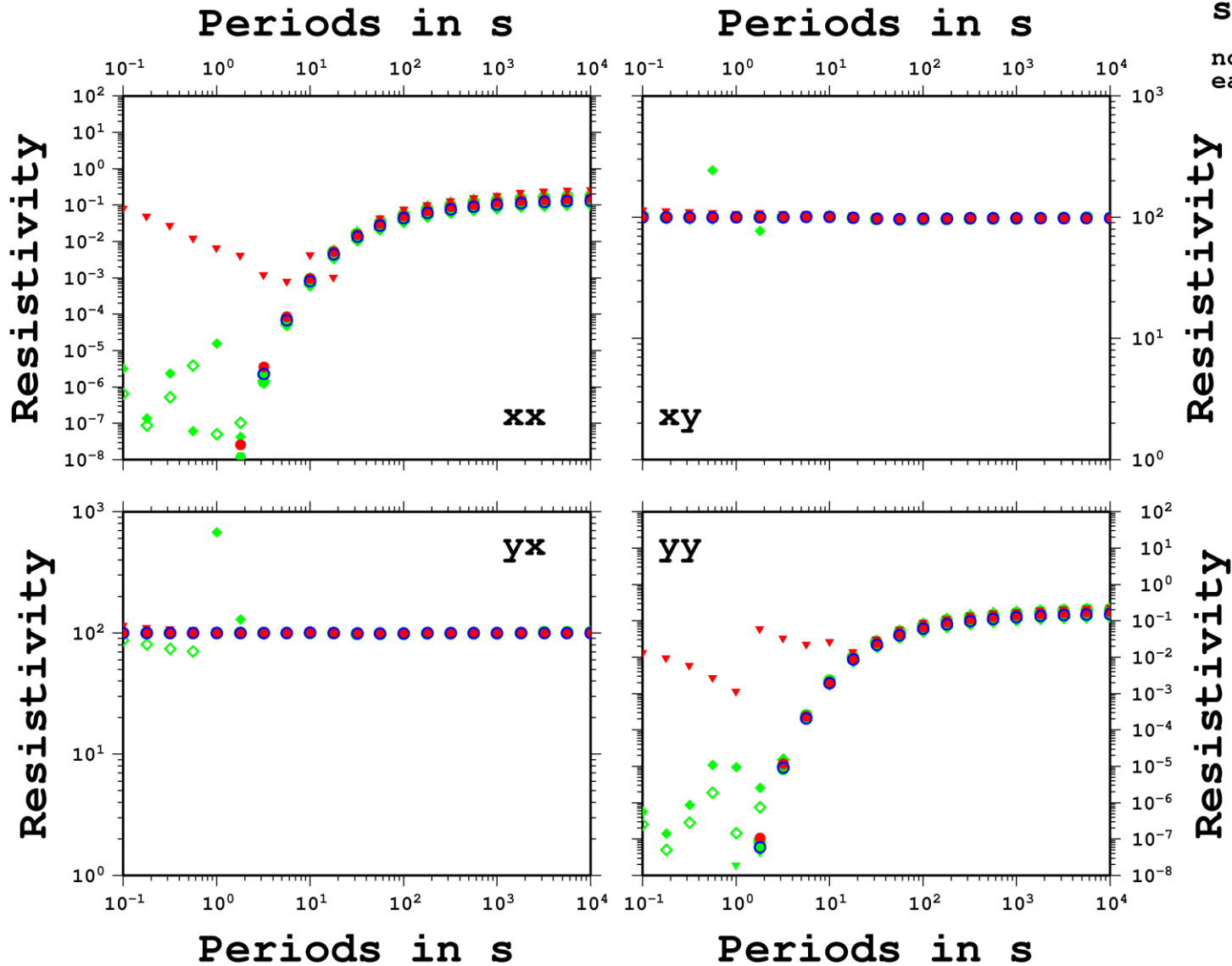


| Name | Code | CPU time | Mesh | Info |
|------------------------------------|-------------------------|------------------------------|--------------------------------------|--|
| Colin Farquharson | FD (mt3dinv-UBC GIF) | | 72 x 72 x 72 109 x 110 x 110 | |
| Elliot Holtham & Doug Oldenburg | FD (mt3dinv-UBC GIF) | 49 h 37 min | | Dual AMD 244 Opteron CPU, 4GB RAM |
| Randy Mackie | FD | 30 min | 95 x 95 x 73 (without air layers) | 36 dual processor Xeons, 3.2 GHz |
| Naser Meqbel | FD | | 42 x 42 x 56 (plus 10 air layers) | |
| Marion Miensopust | FD (WinGlink) | 51 min | 85 x 62 x 34 (plus 10 air layers) | Intel Core2 CPU E6300, 1.86GHz, 3.25 GB RAM |
| | FD (mt3dinv-UBC GIF) | | 92 x 58 x 37 | |
| | FD (wsinv3dmt) | 1 h 18 min | 39 x 40 x 18 (plus 7 air layers) | Intel Core2 CPU E6300, 1.86GHz, 3.25 GB RAM |
| Greg Newman | FD | 4 min - 38 min per period | | Parallel Linux cluster using 64 cores |
| Yutaka Sasaki | FD | 1 h 14 min | 65 x 83 x 51 | Pentium 4 PC, 2GB RAM |
| Antje Franke | FE | 7 h 40 min | 61000/87000 degrees of freedom | PC with AMD Athlon 3200+ Processor, 3GB RAM |
| Nuree Han & Tae Jong Lee | FE (EG3DTMT) | 57 h 16 min | 48 x 47 x 31 | Cluster: 256 nodes IBM x335 server, 2 CPUs each (Pentium IV Xeon DP 2.8 GHz) |
| Dmitry Avdeev | IE (x3d) | 4 h 11 min | 120 x 135 x 23 | Laptop with T7200 2GHz CPU, 2GB RAM |



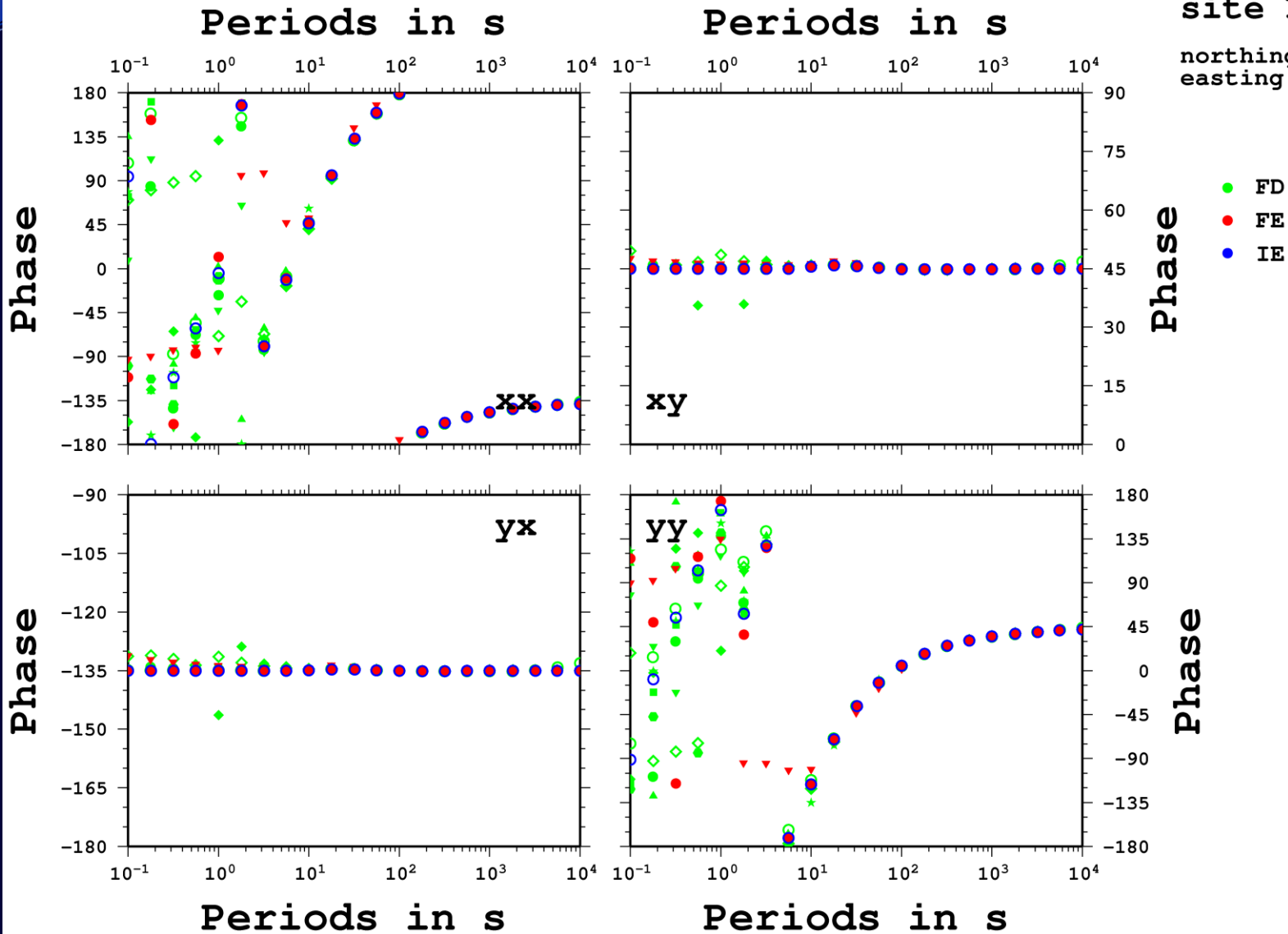
site N16

northing 15000 m
easting 37500 m

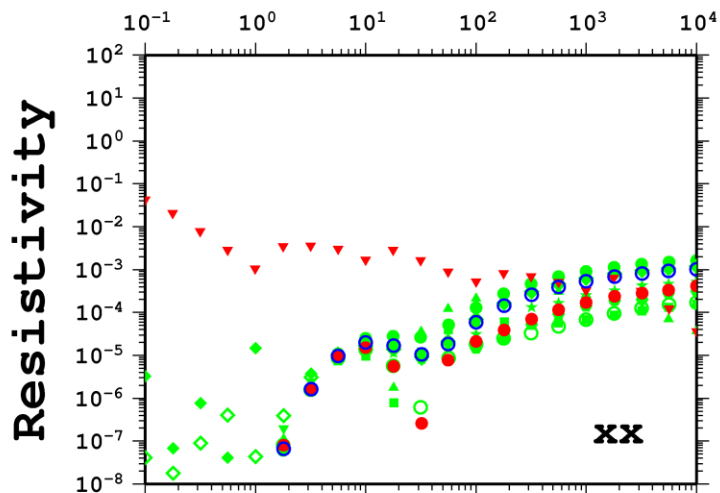


site N16

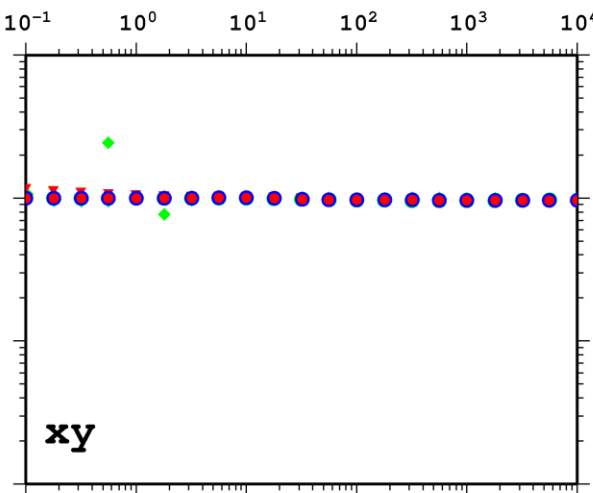
northing 15000 m
easting 37500 m



Periods in s



Periods in s



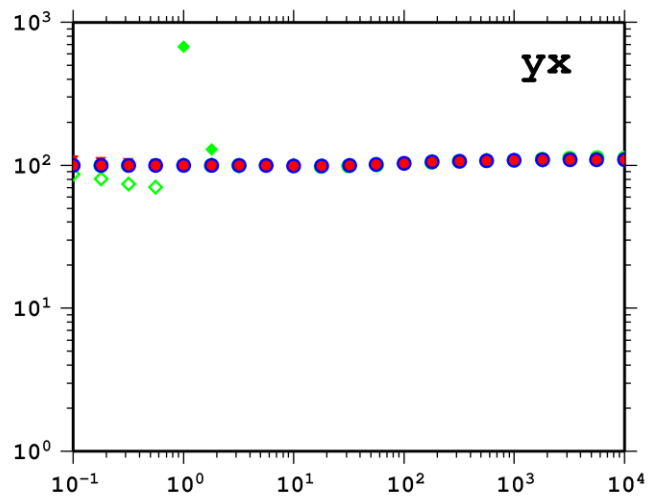
site S01

northing -15000 m
easting -37500 m

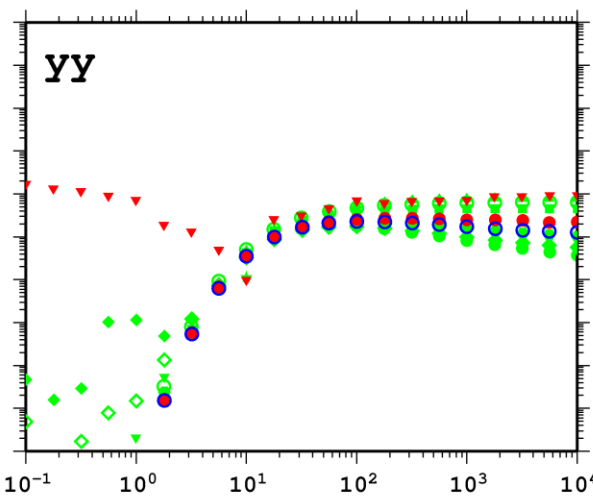
Resistivity

- FD
- FE
- IE

Resistivity



yy



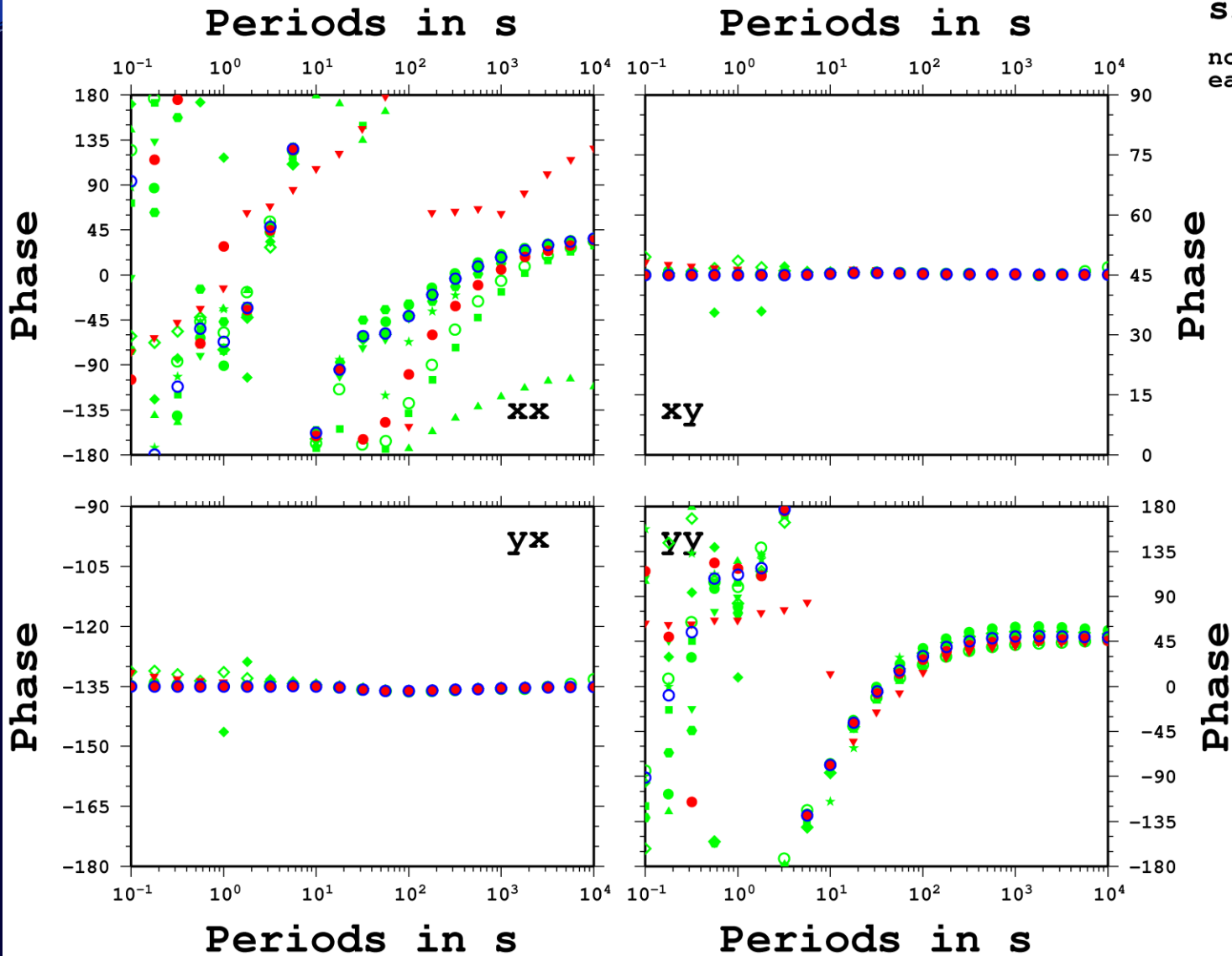
Resistivity

Periods in s

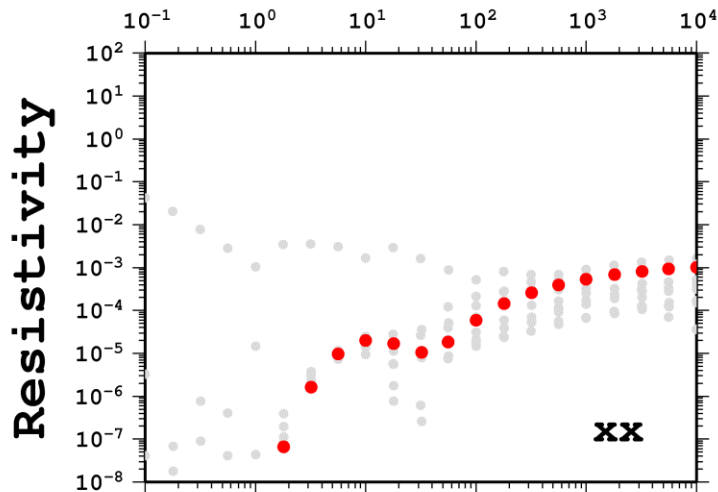
Periods in s

site S01

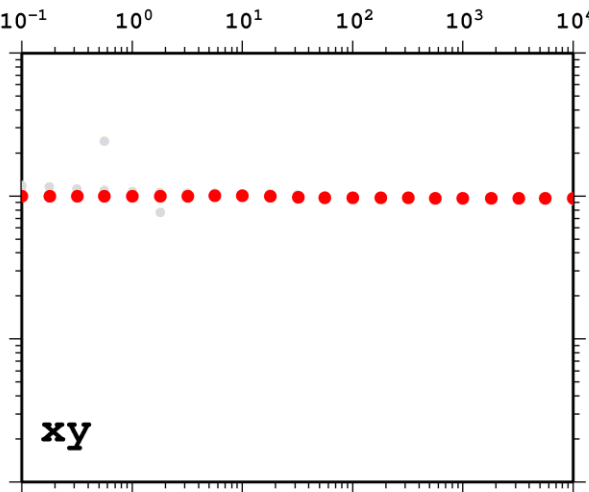
northing -15000 m
easting -37500 m



Periods in s



Periods in s



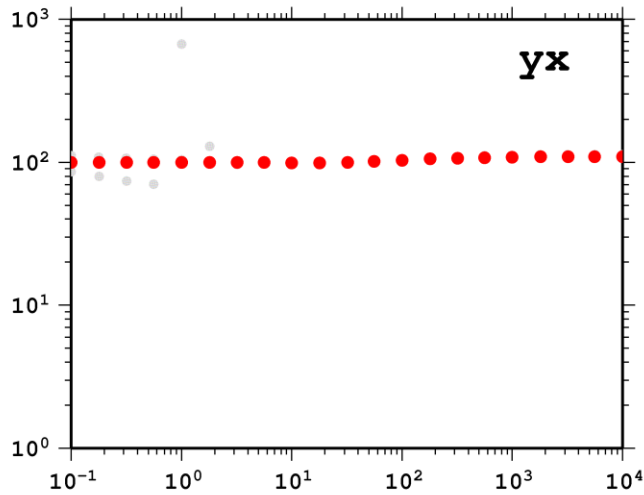
site S01

northing -15000 m
easting -37500 m

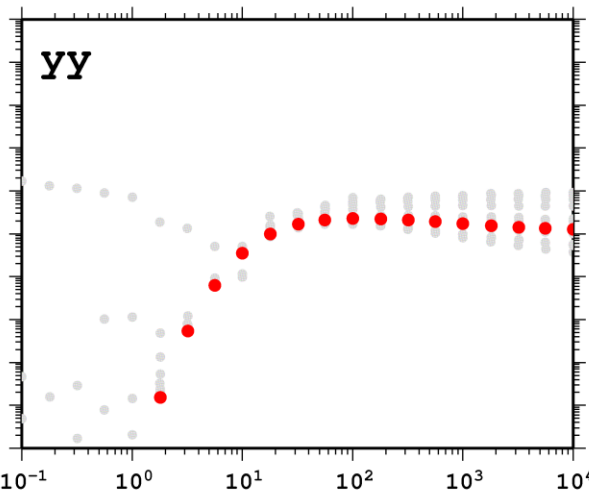
Resistivity

● X3D

Resistivity



yy



Resistivity

Periods in s

Periods in s

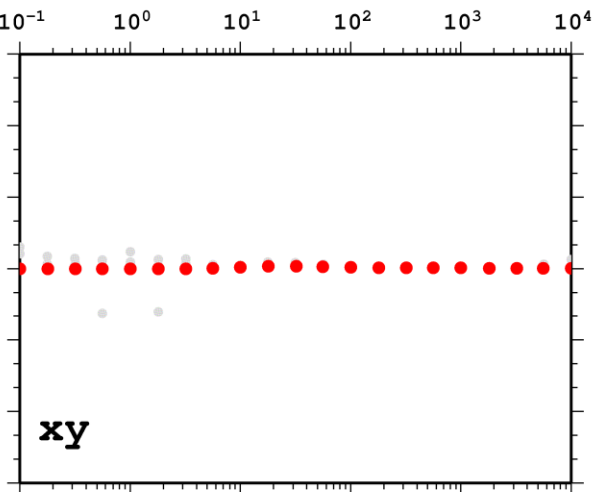
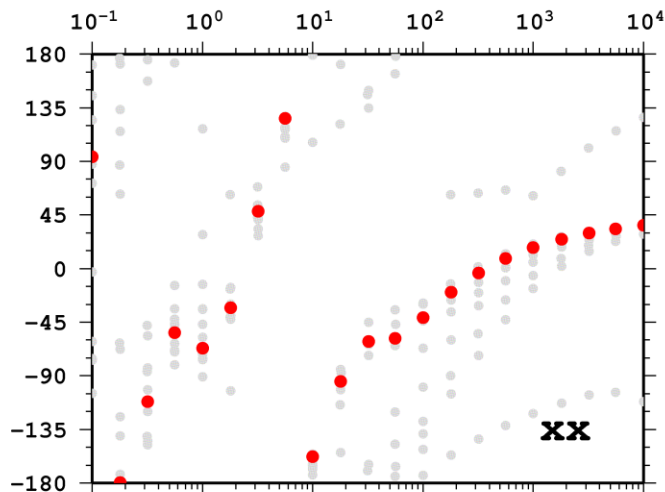
Periods in s

Periods in s

site S01

northing -15000 m
easting -37500 m

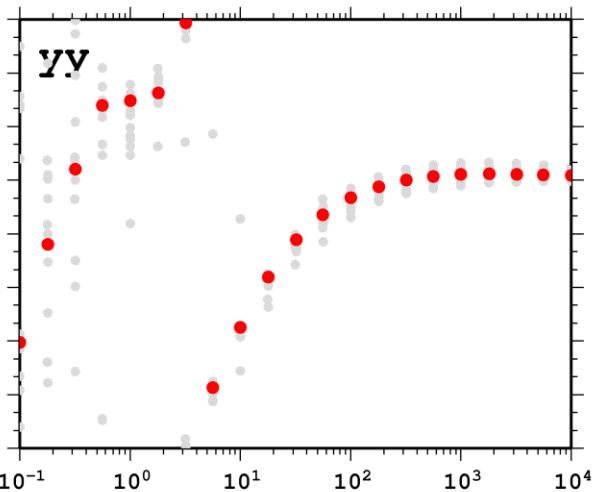
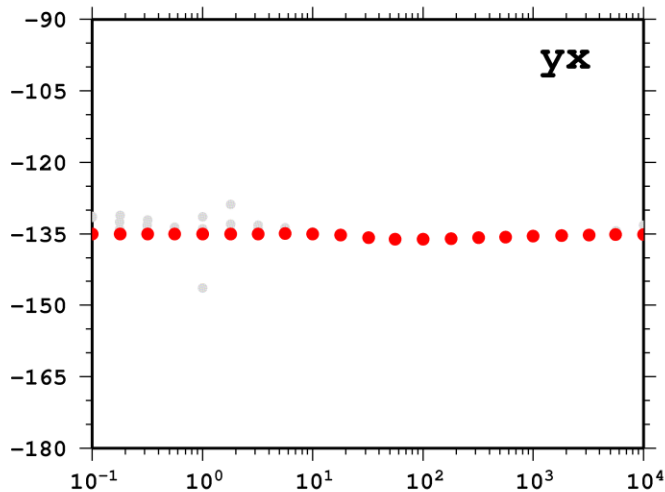
Phase



Phase

● X3D

Phase



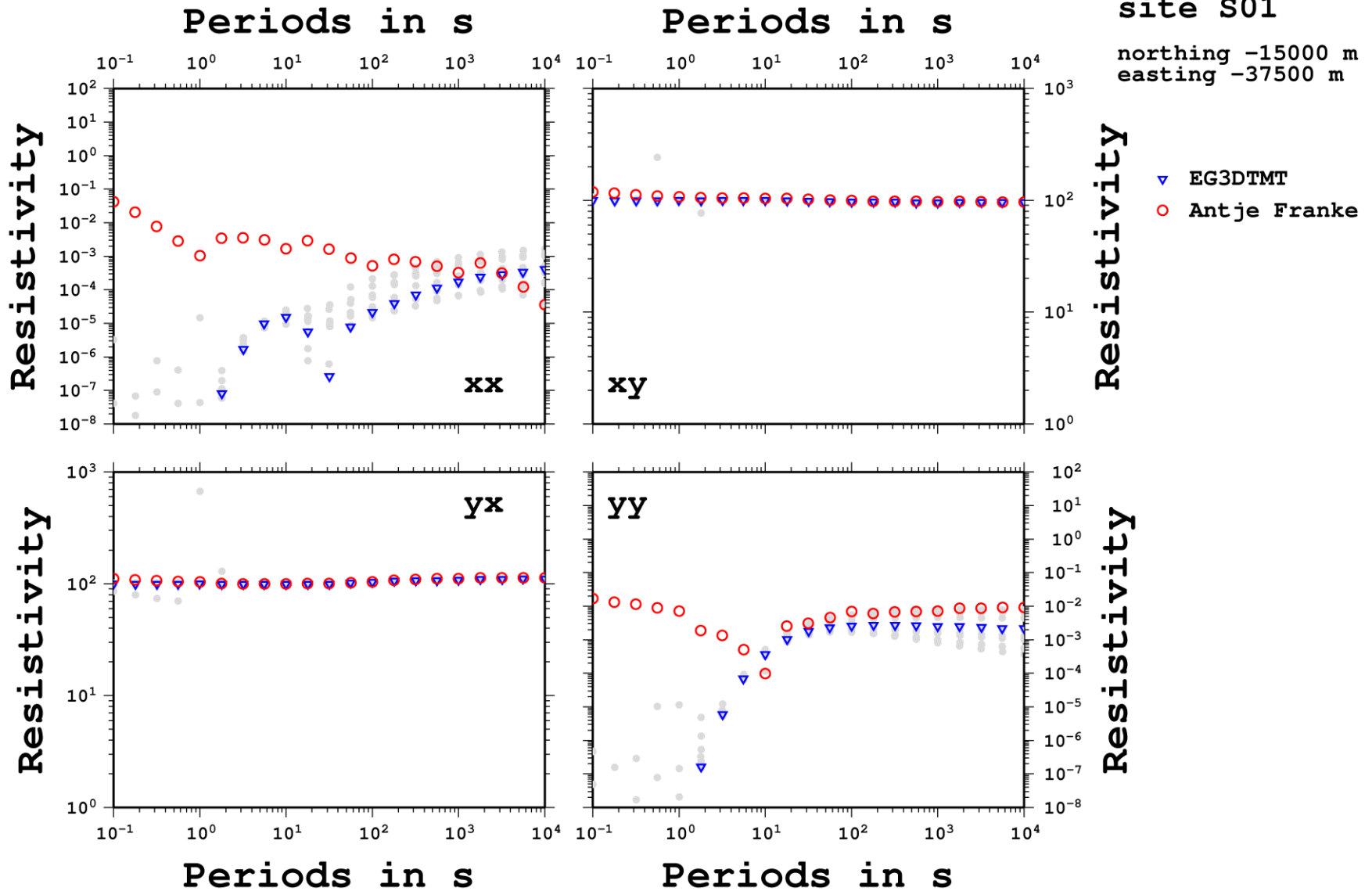
Phase

Periods in s

Periods in s

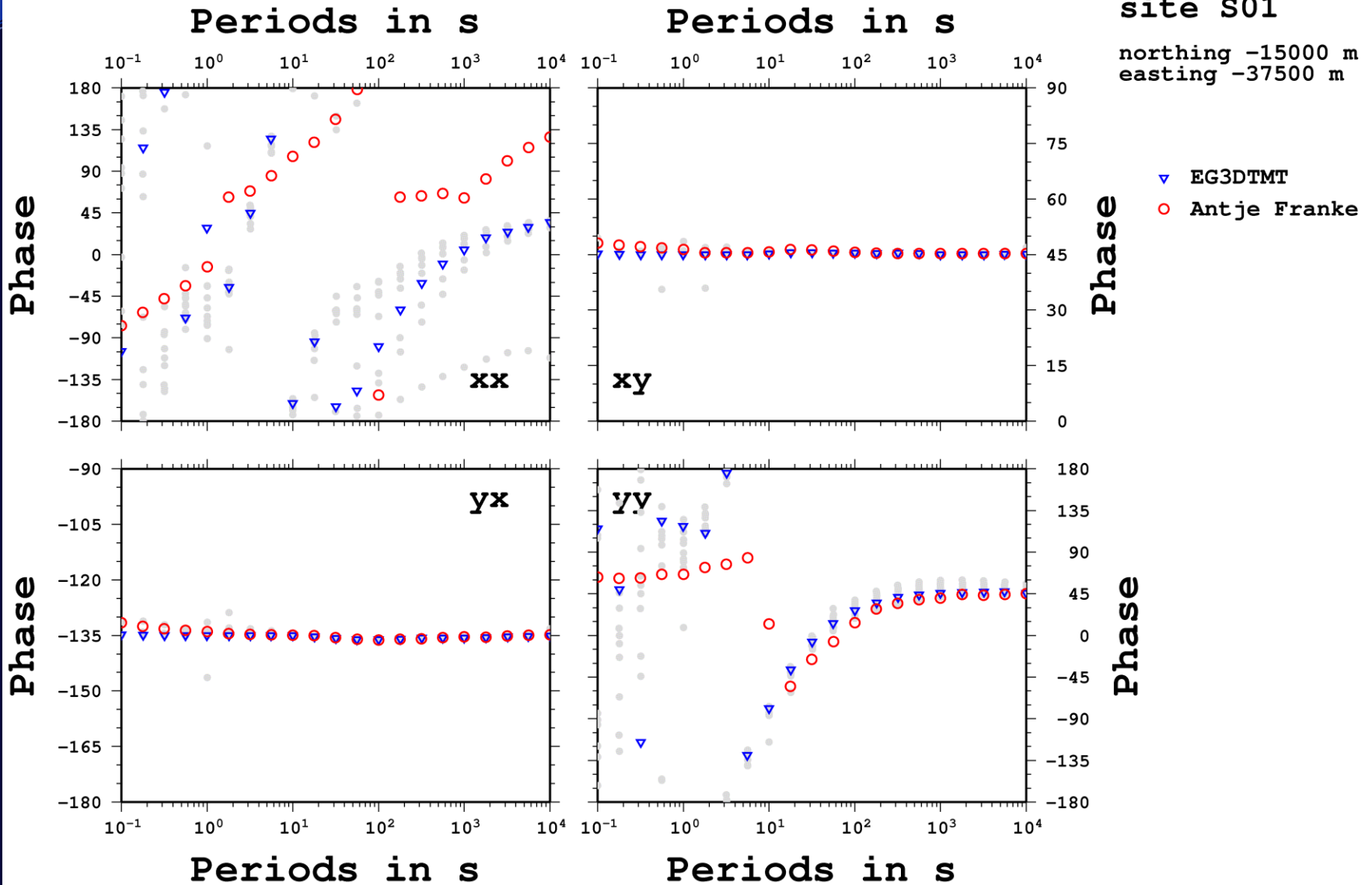
site S01

northing -15000 m
easting -37500 m



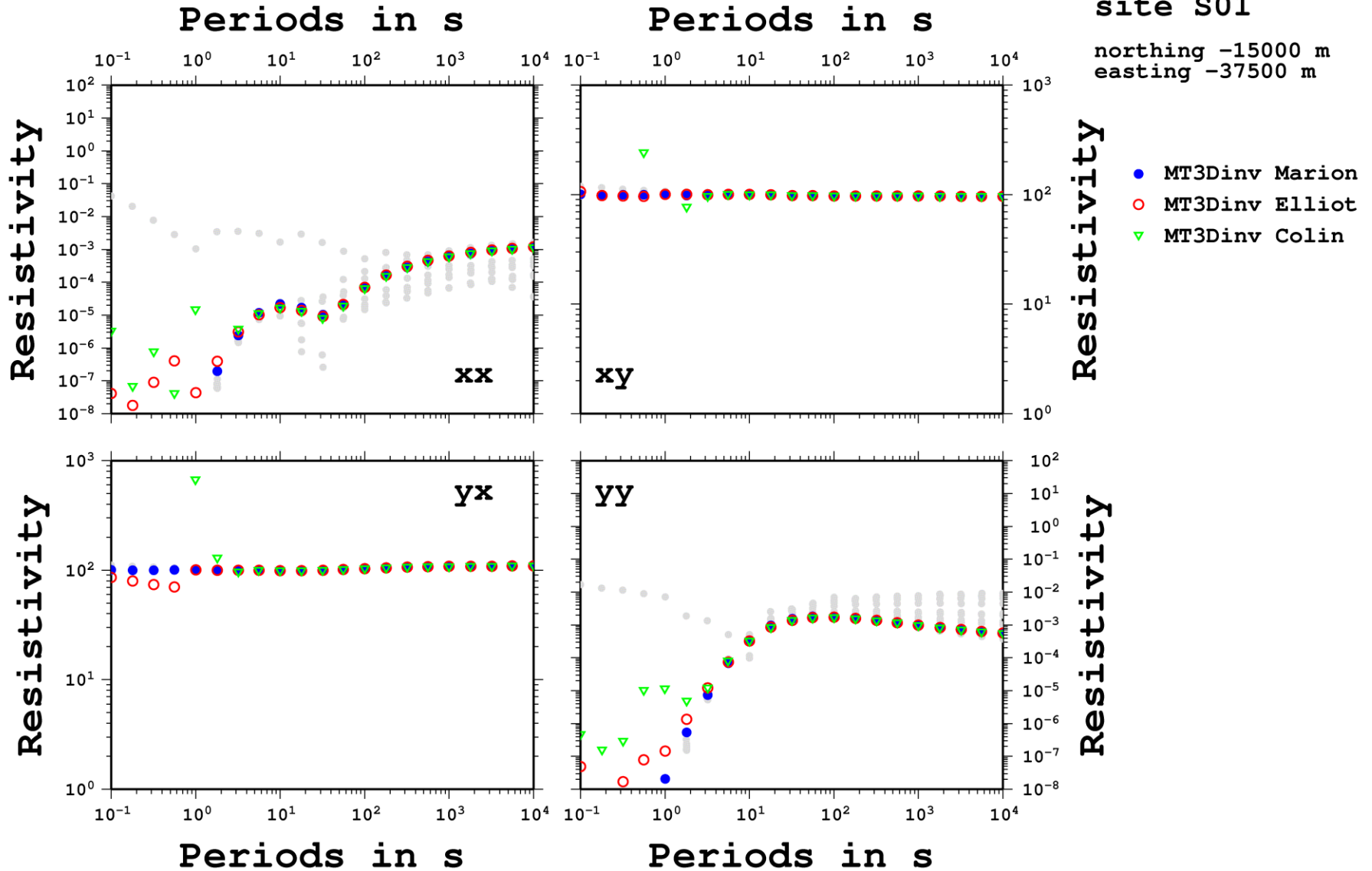
site S01

northing -15000 m
easting -37500 m



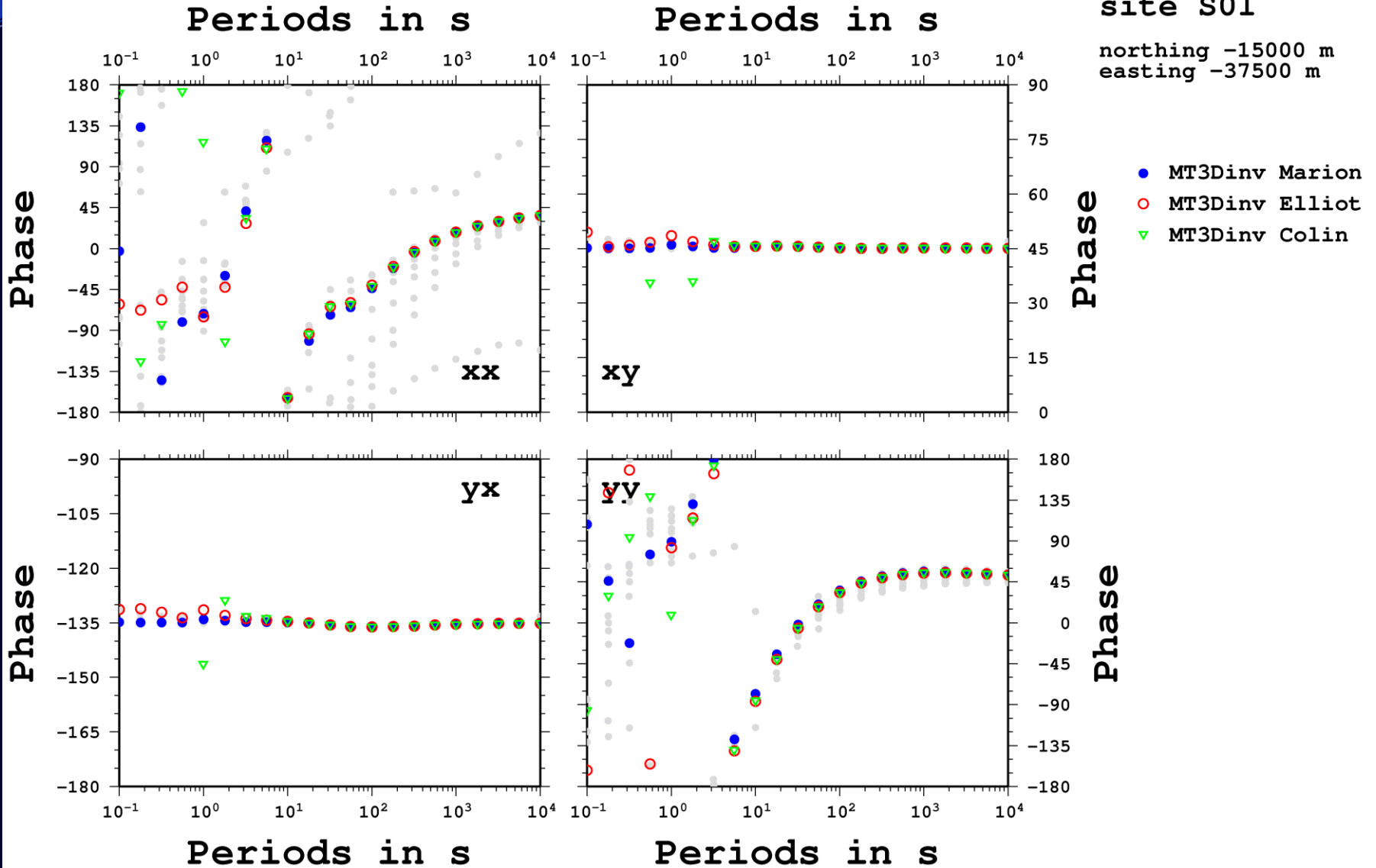
site S01

northing -15000 m
easting -37500 m

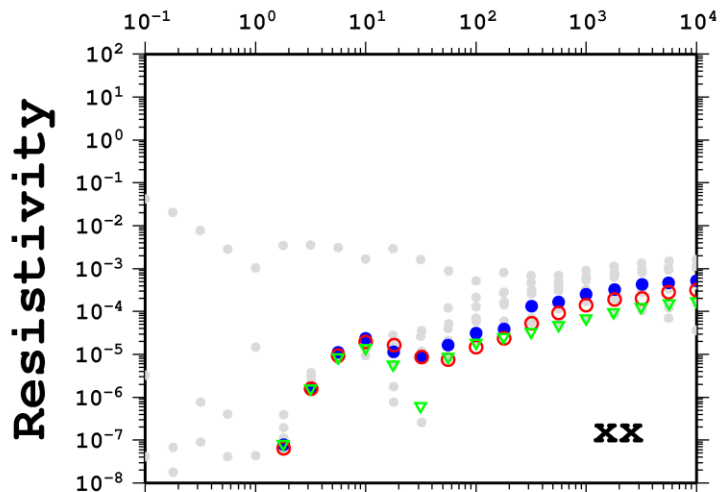


site S01

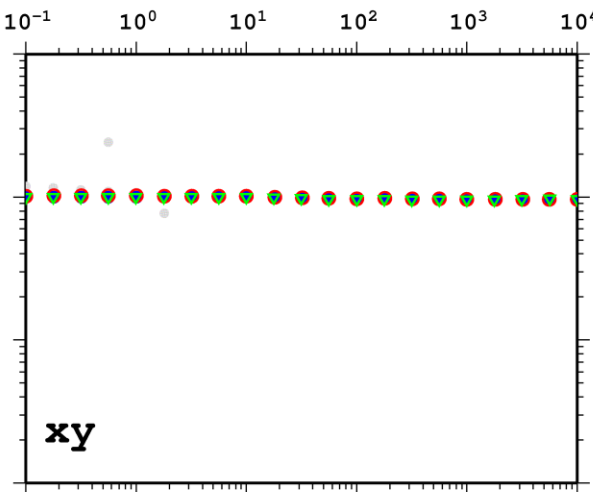
northing -15000 m
easting -37500 m



Periods in s



Periods in s



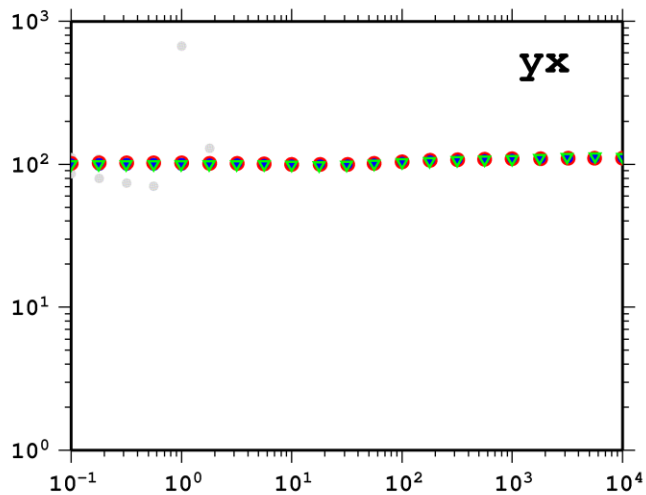
site S01

northing -15000 m
easting -37500 m

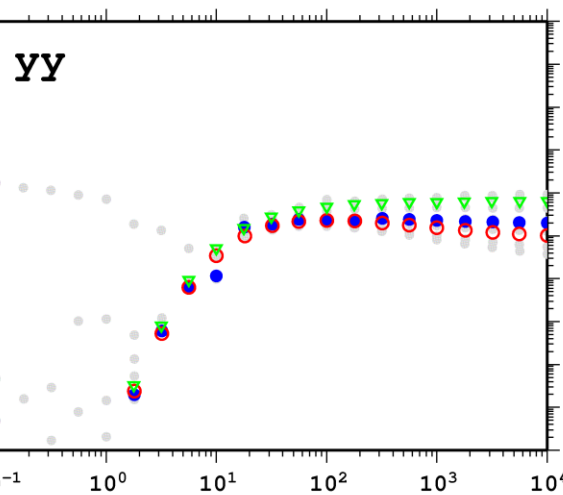
Resistivity

- Yutaka Sasaki
- Greg Newman
- ▽ Naser Meqbel

Resistivity



Periods in s

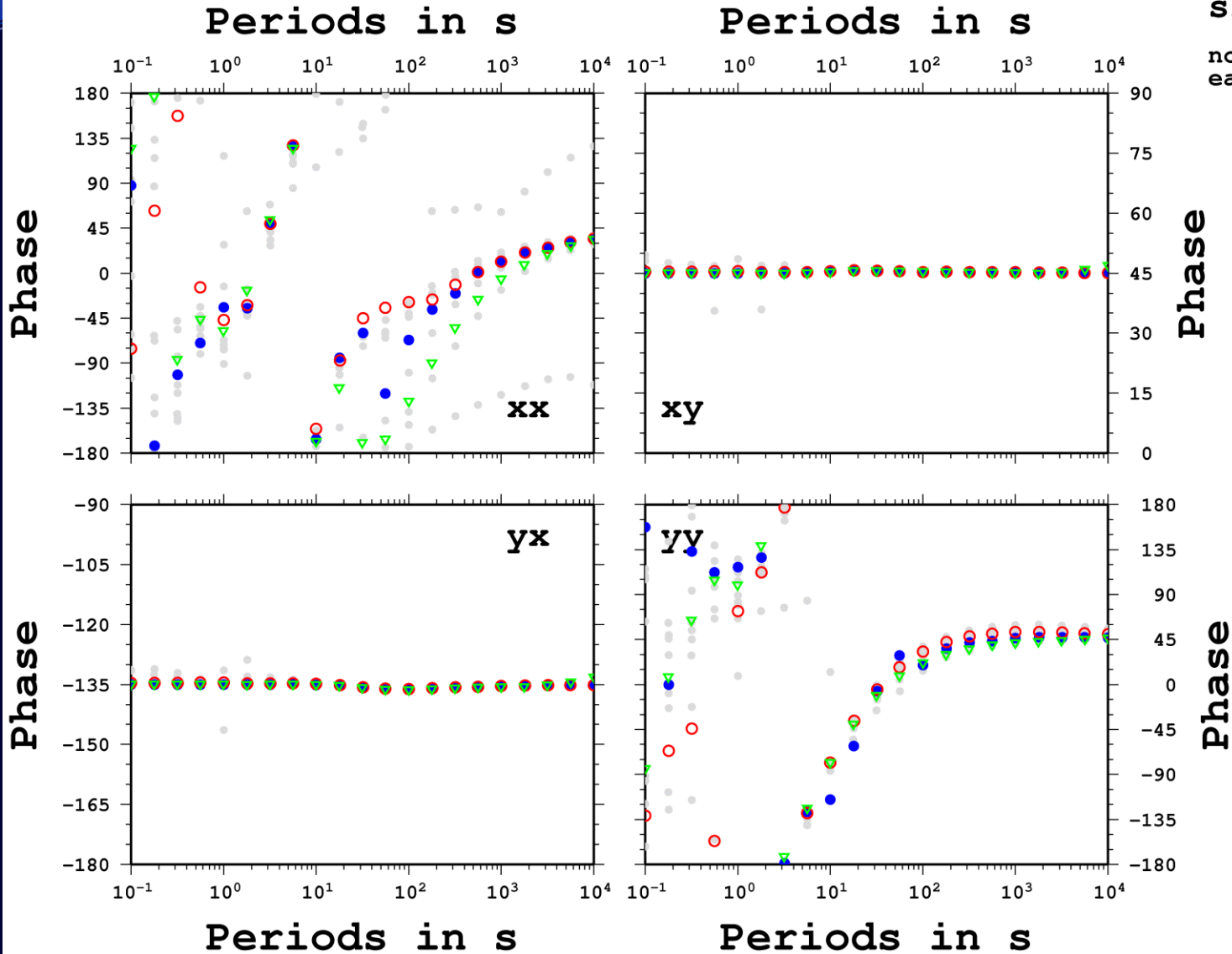


Periods in s

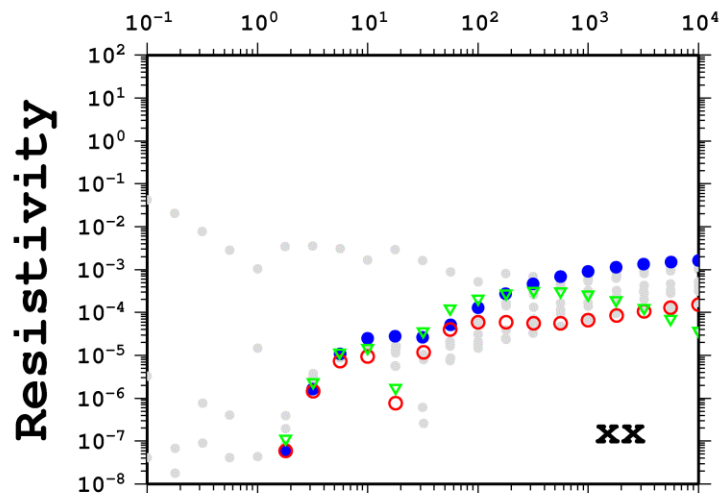
Resistivity

site S01

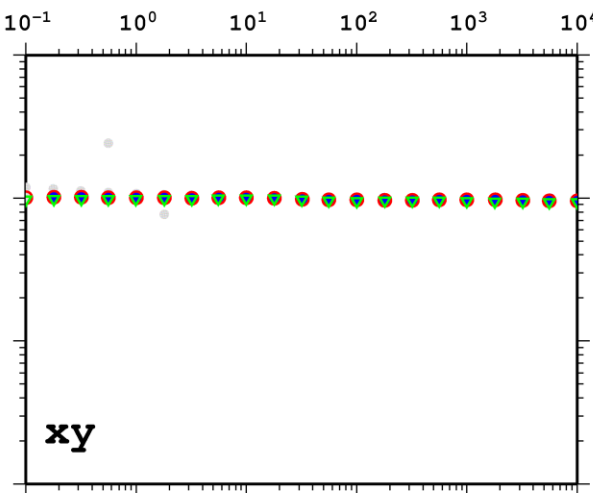
northing -15000 m
easting -37500 m



Periods in s



Periods in s



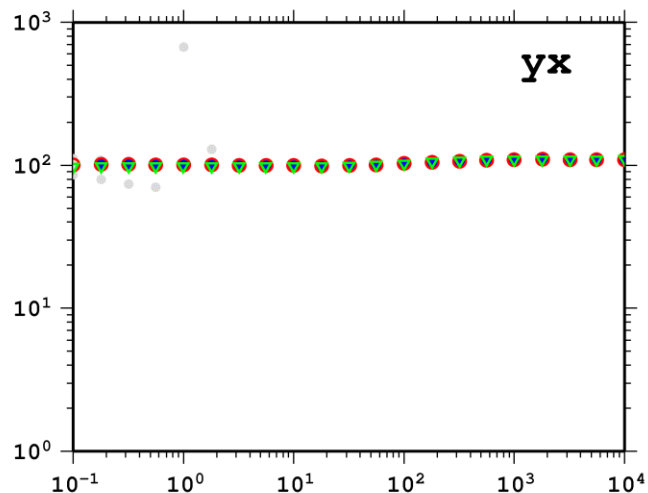
site S01

northing -15000 m
easting -37500 m

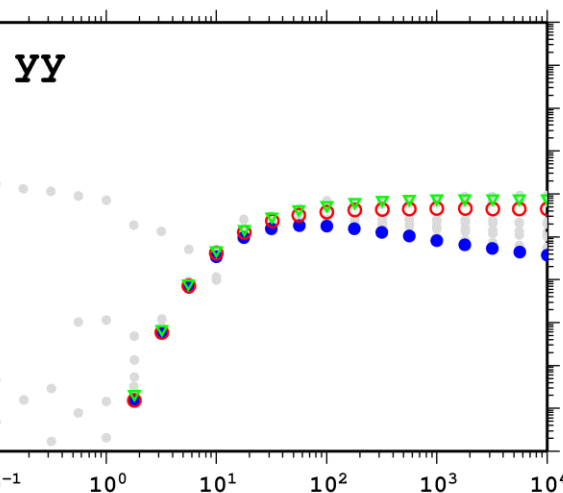
Resistivity

- WinGlink Marion
- Randy Mackie
- ▼ wsinv3dmT Marion

Resistivity



Periods in s



Periods in s

Resistivity

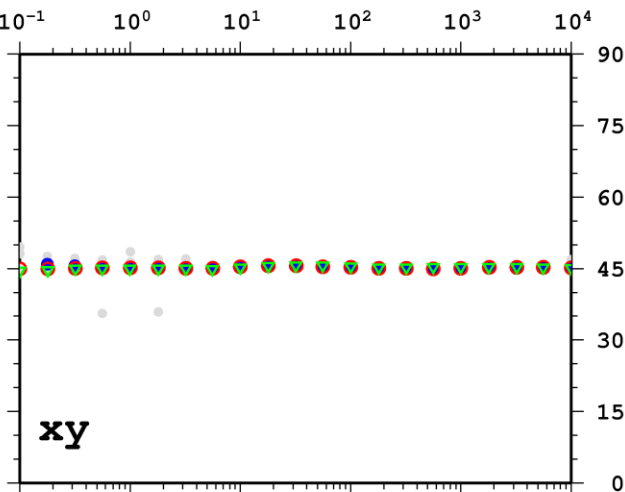
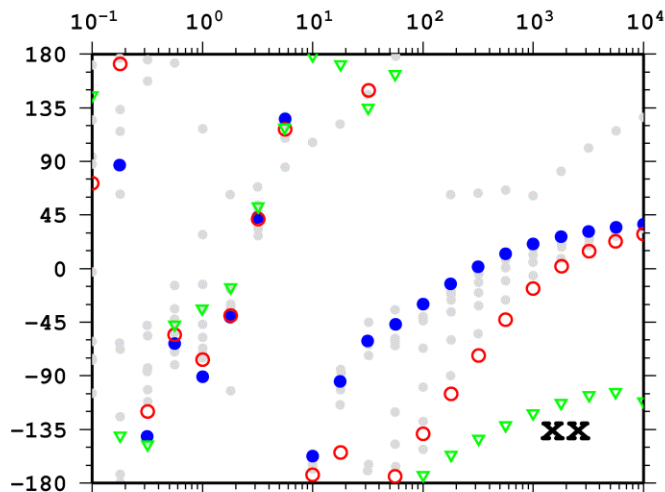
Periods in s

Periods in s

site S01

northing -15000 m
easting -37500 m

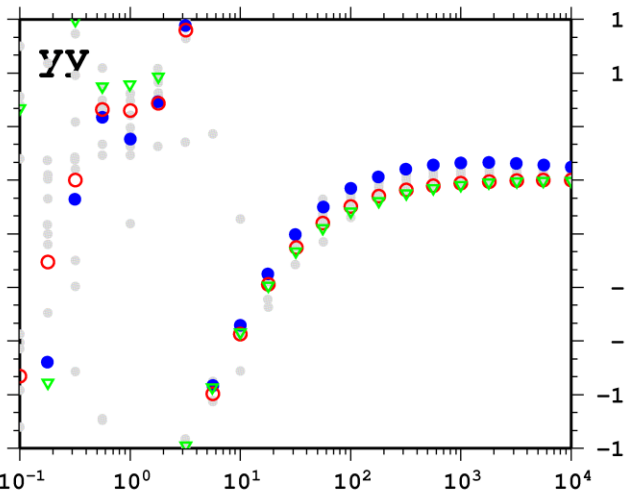
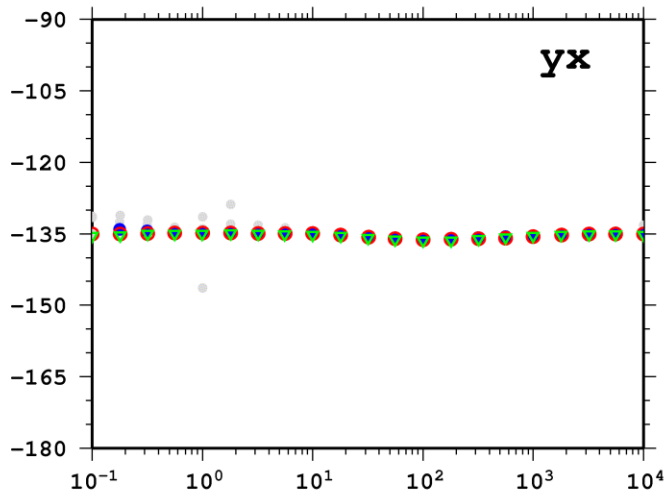
Phase



Phase

- WinGlink Marion
- Randy Mackie
- ▼ wsinv3dmt Marion

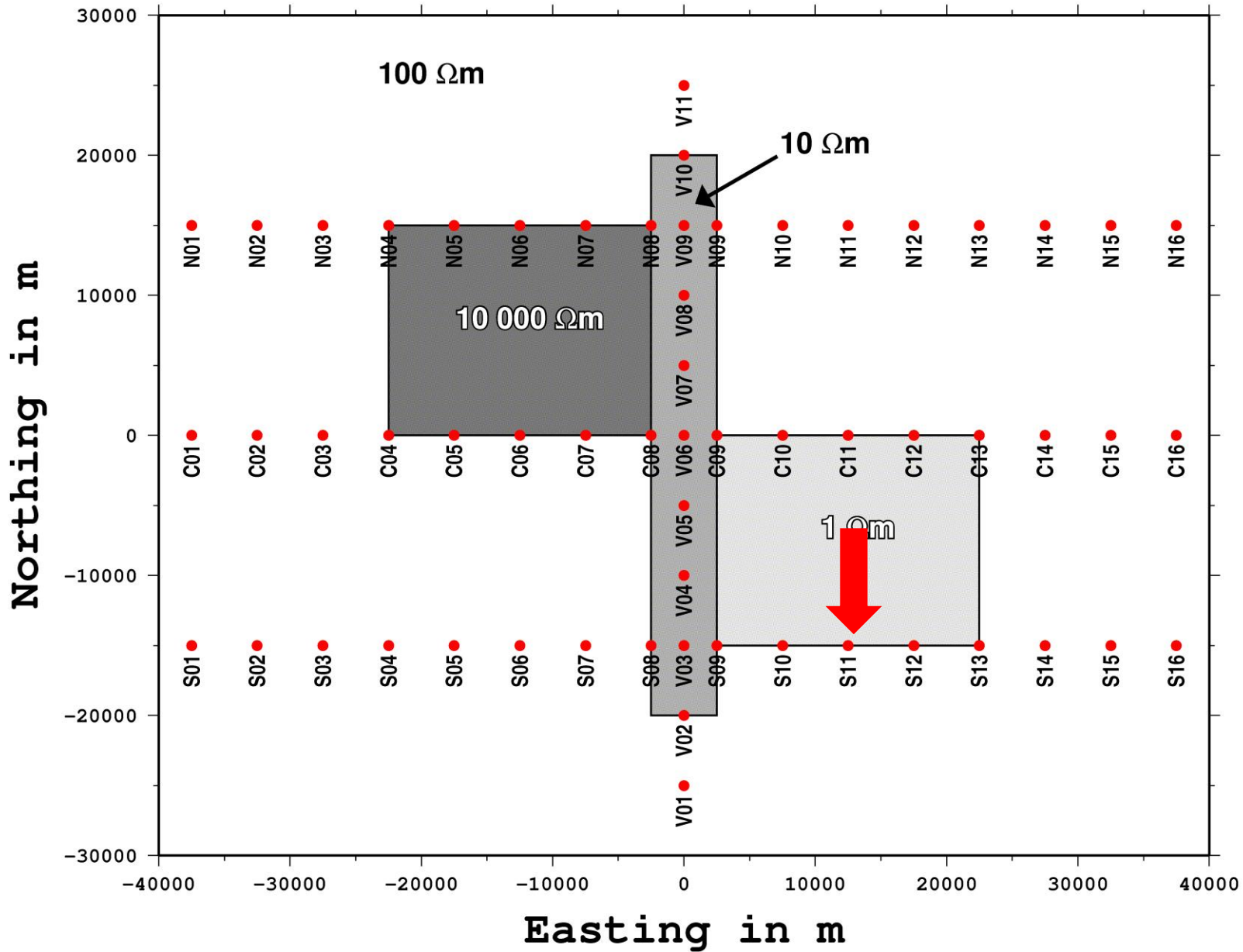
Phase



Phase

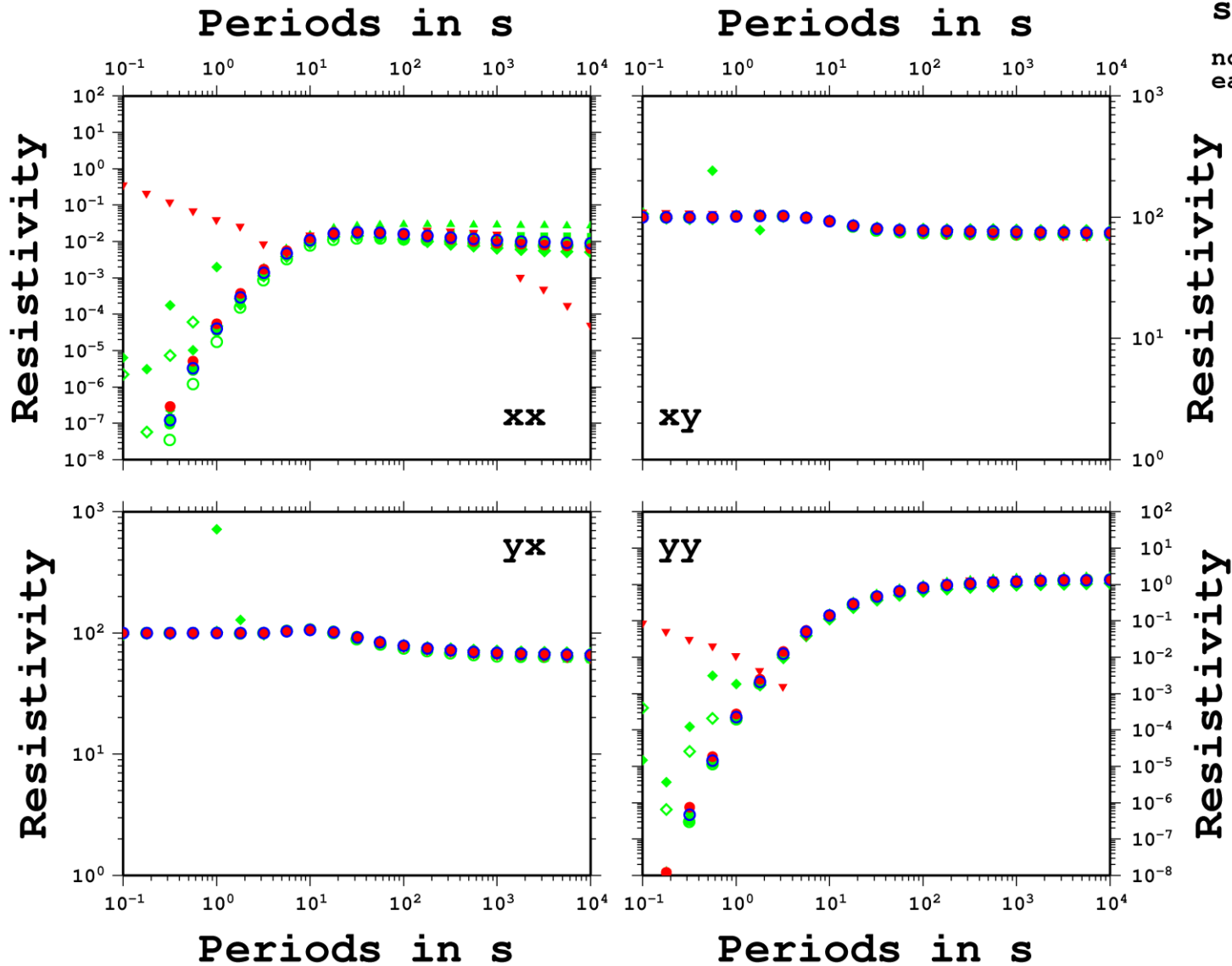
Periods in s

Periods in s



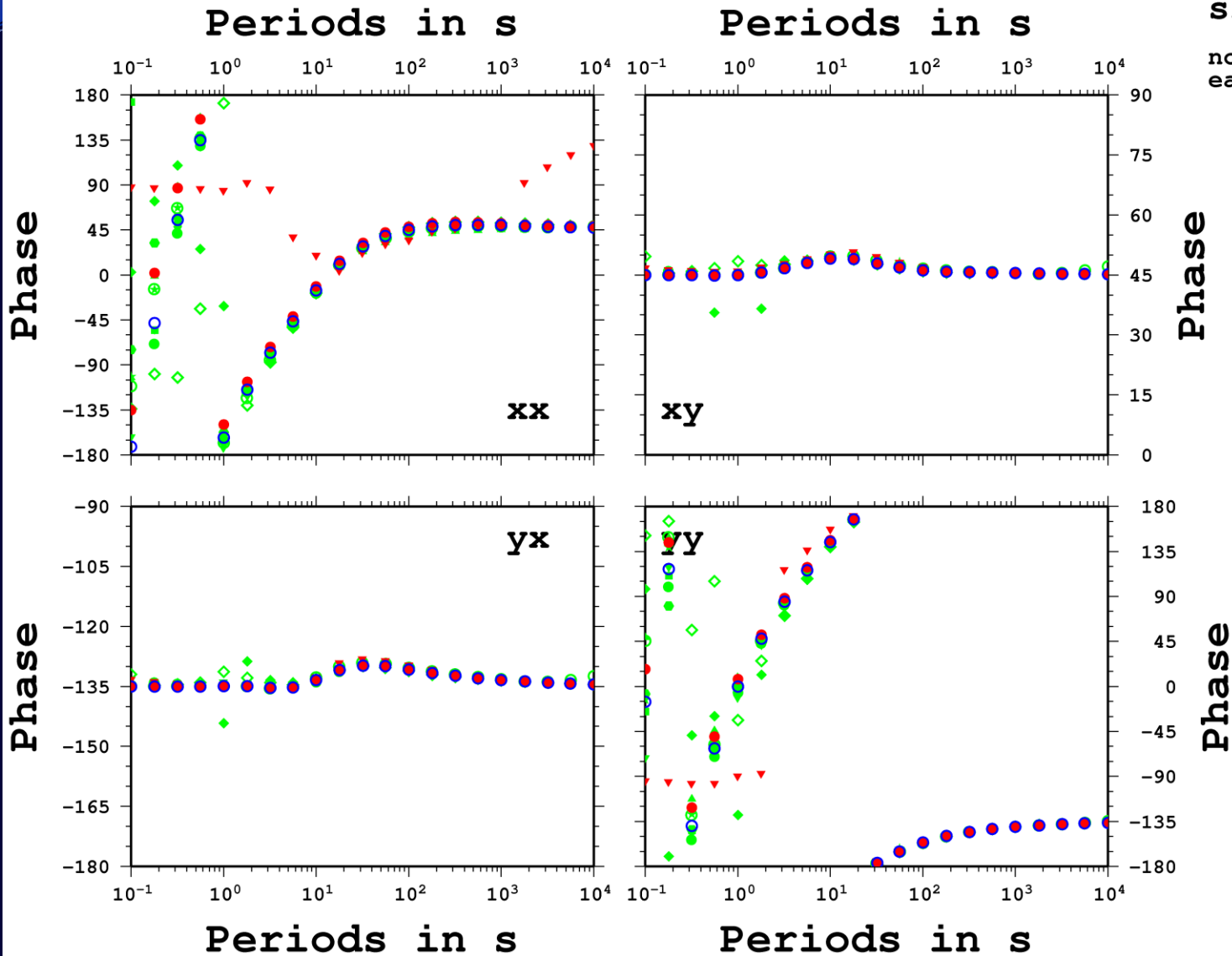
site S11

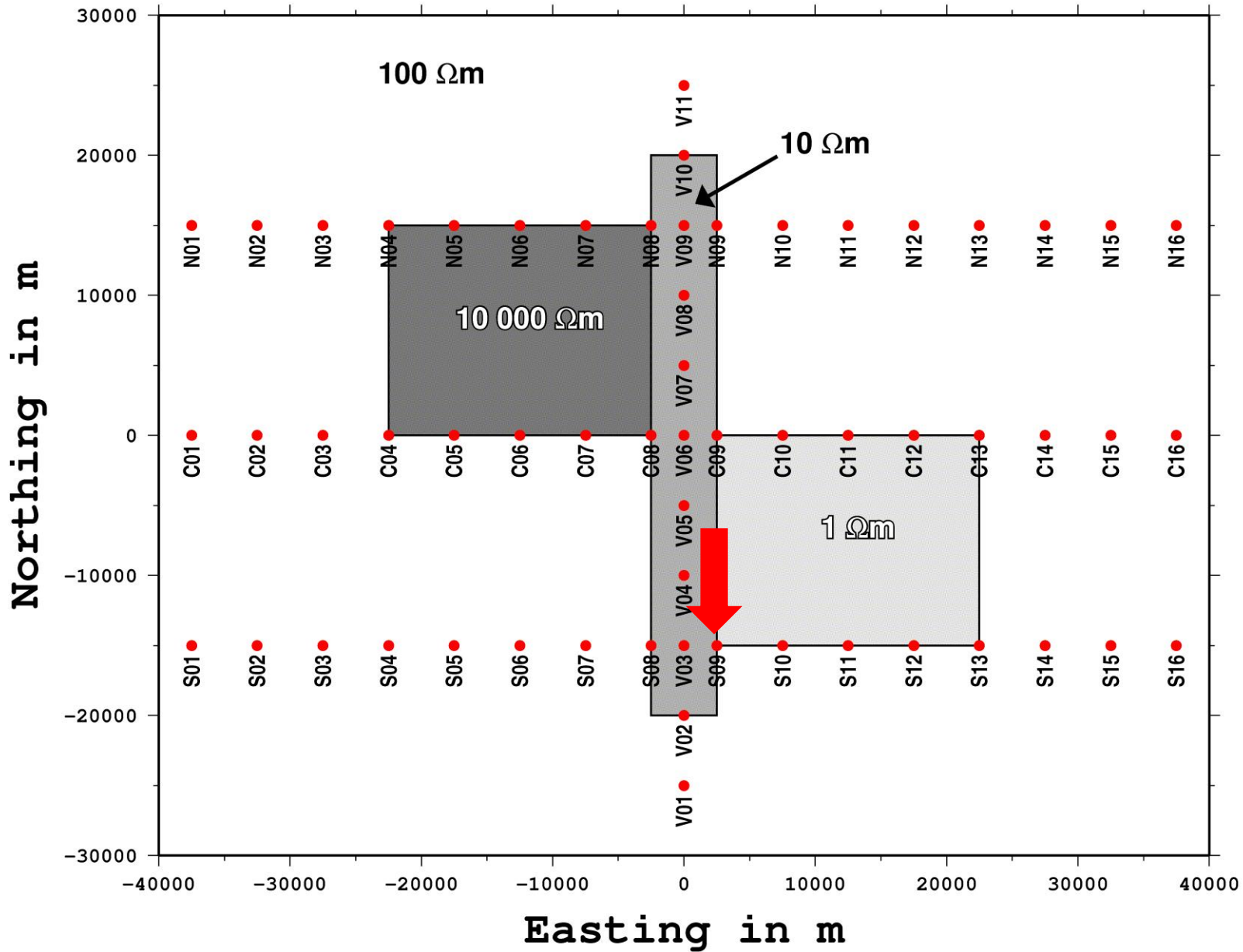
northing -15000 m
easting 12500 m



site S11

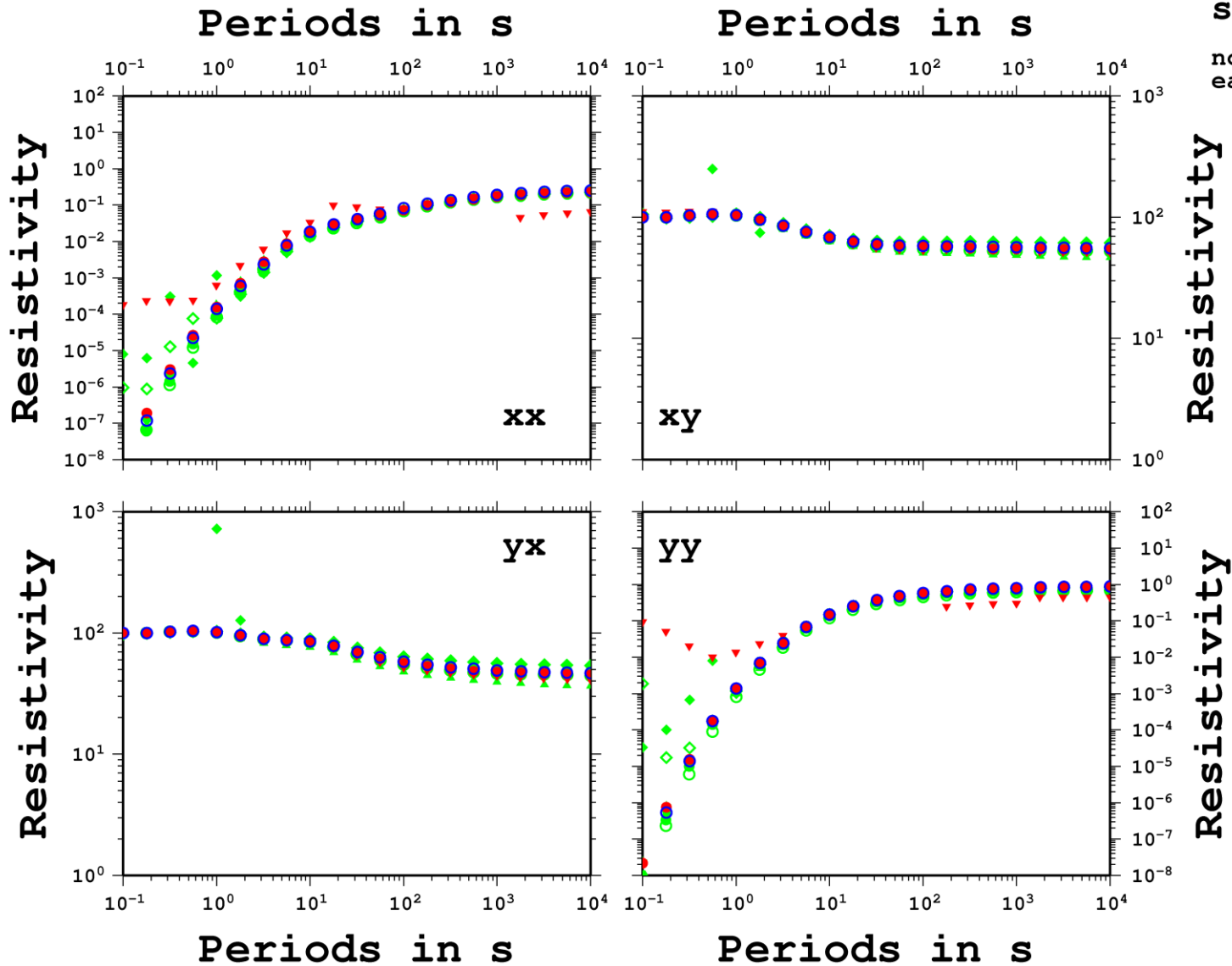
northing -15000 m
easting 12500 m





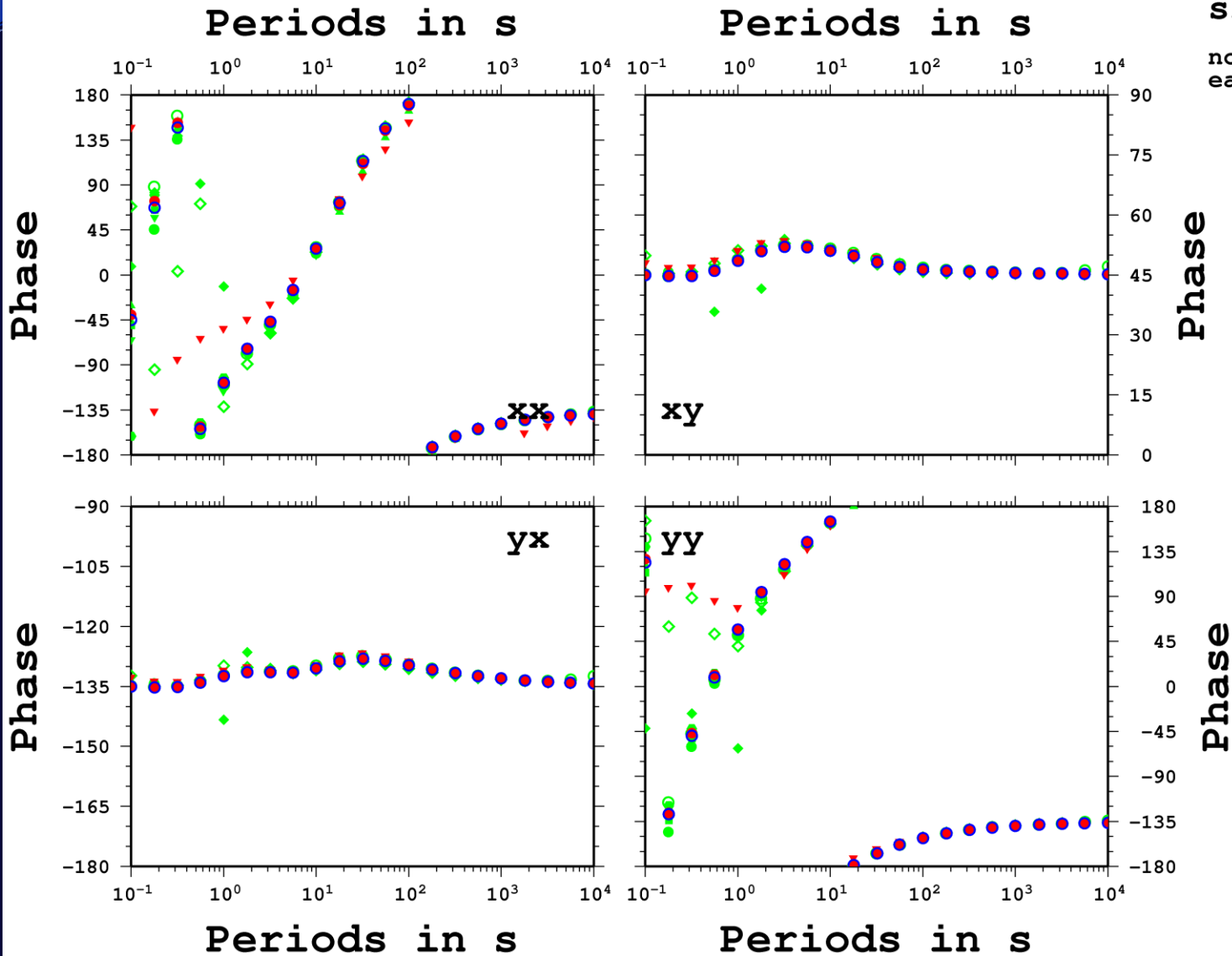
site S09

northing -15000 m
easting 2500 m

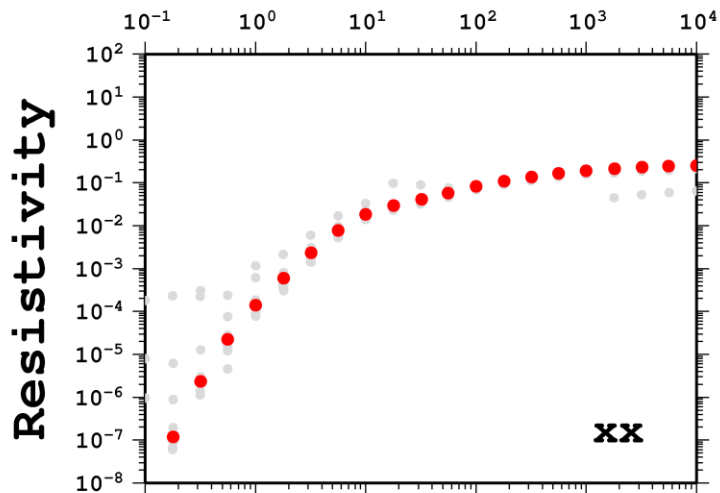


site S09

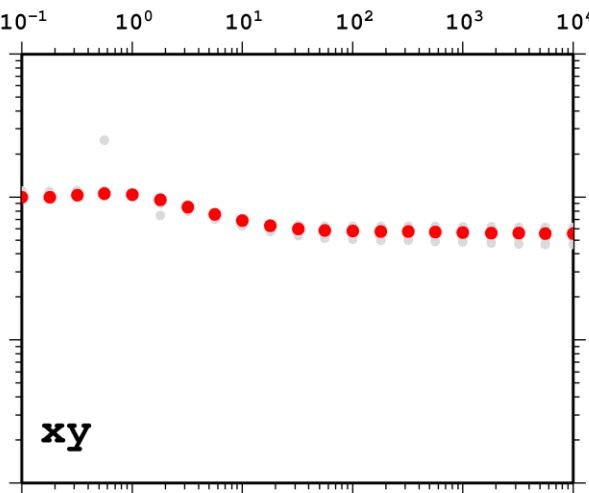
northing -15000 m
easting 2500 m



Periods in s



Periods in s

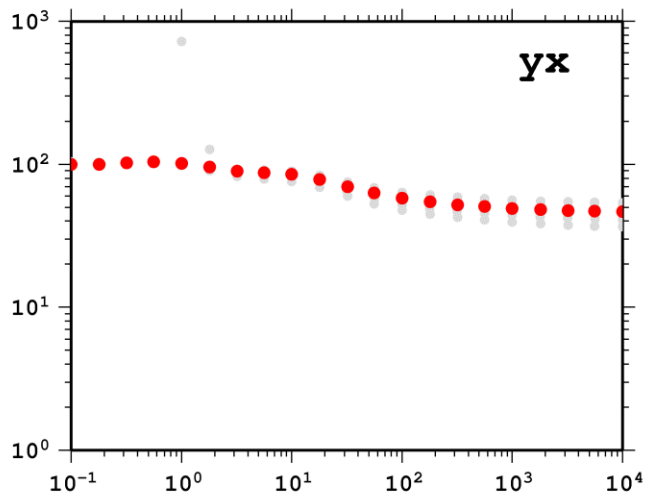


site S09

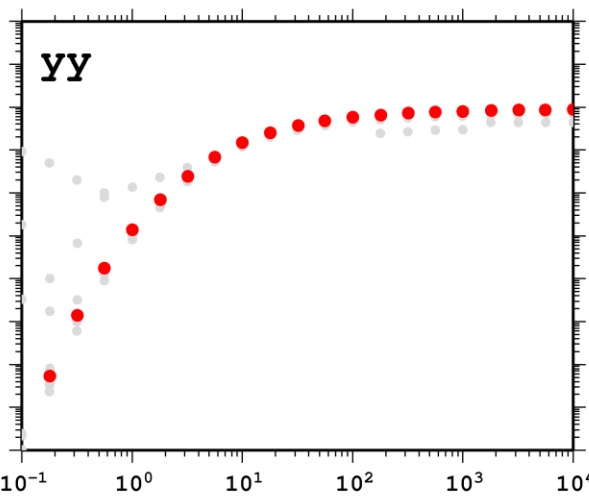
northing -15000 m
easting 2500 m

● X3D

Resistivity



yy



Periods in s

Periods in s

Resistivity

Resistivity

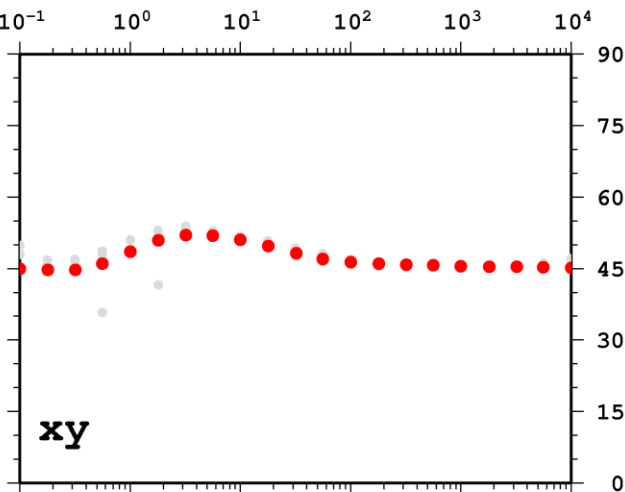
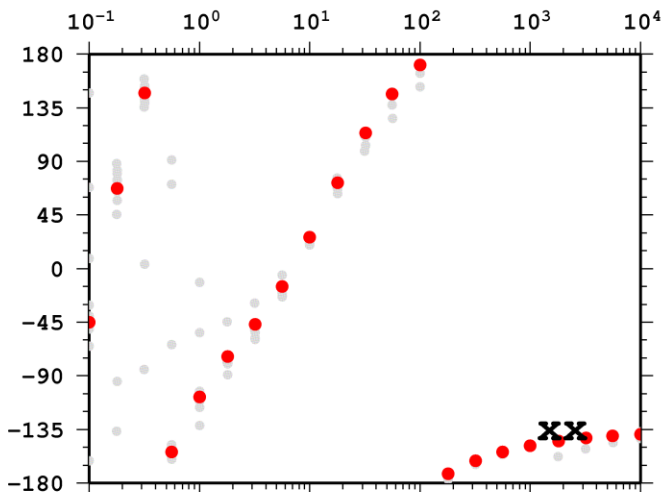
Periods in s

Periods in s

site S09

northing -15000 m
easting 2500 m

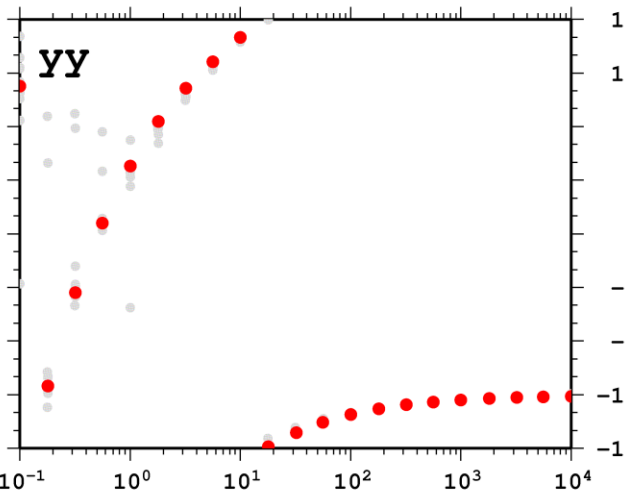
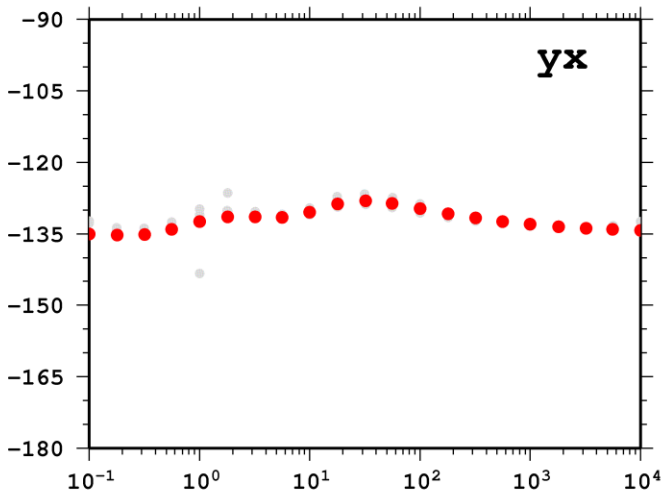
Phase



Phase

● X3D

Phase

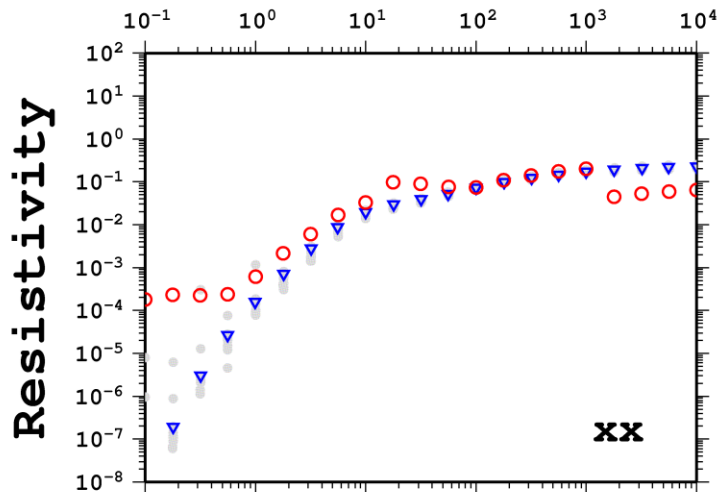


Phase

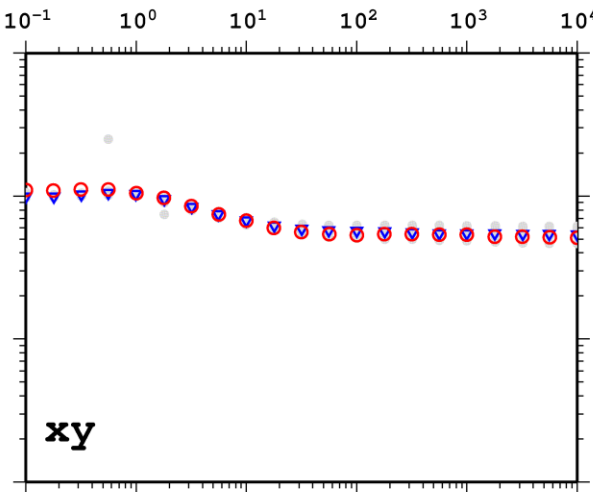
Periods in s

Periods in s

Periods in s



Periods in s



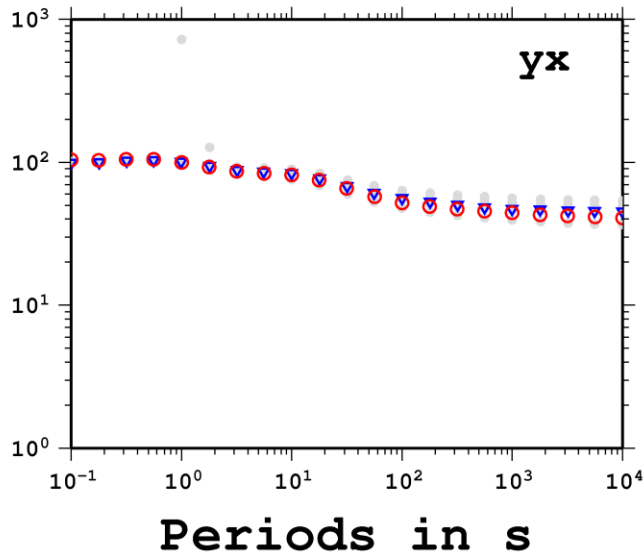
site S09

northing -15000 m
easting 2500 m

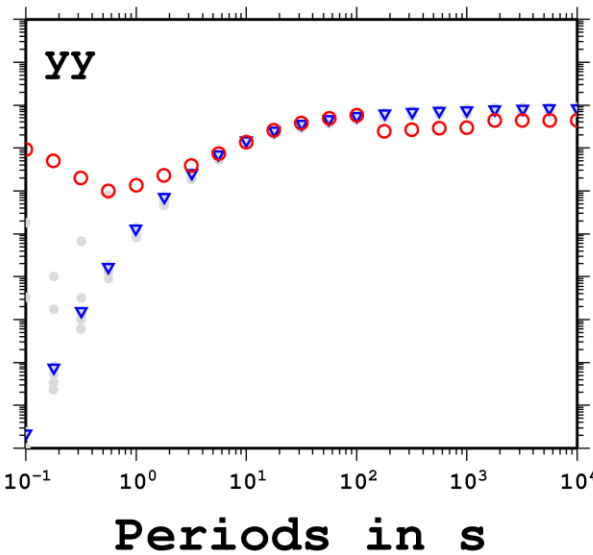
Resistivity

- EG3DTMT
- Antje Franke

Resistivity



yy



Resistivity

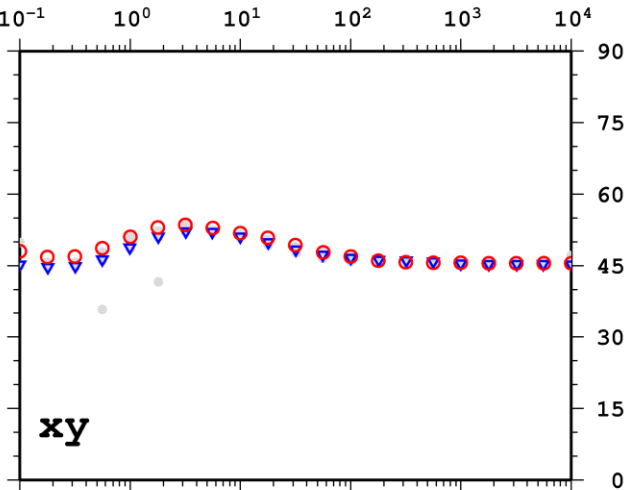
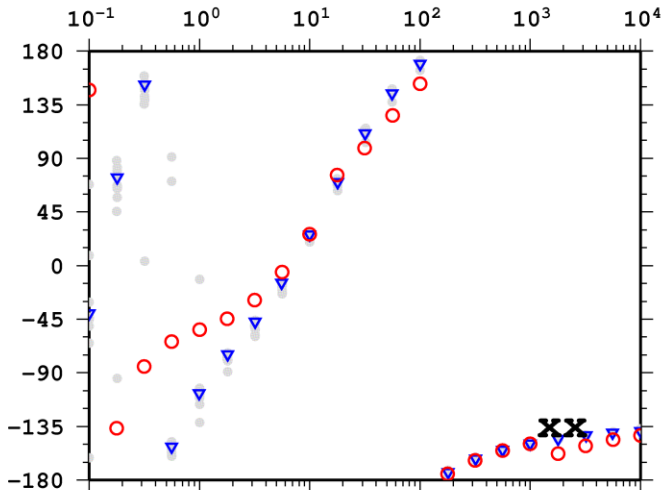
Periods in s

Periods in s

site S09

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easting 2500 m

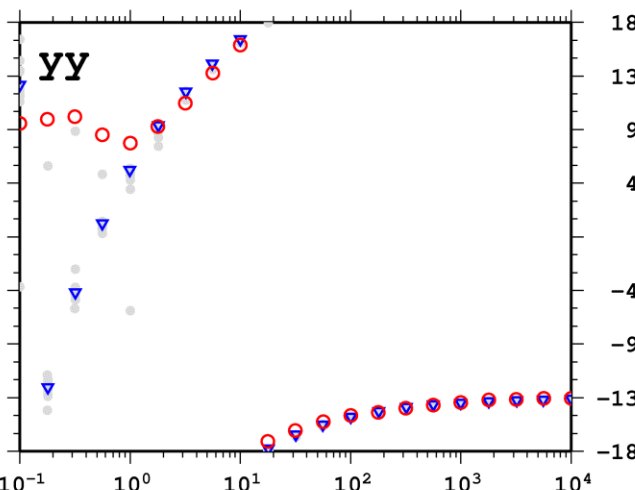
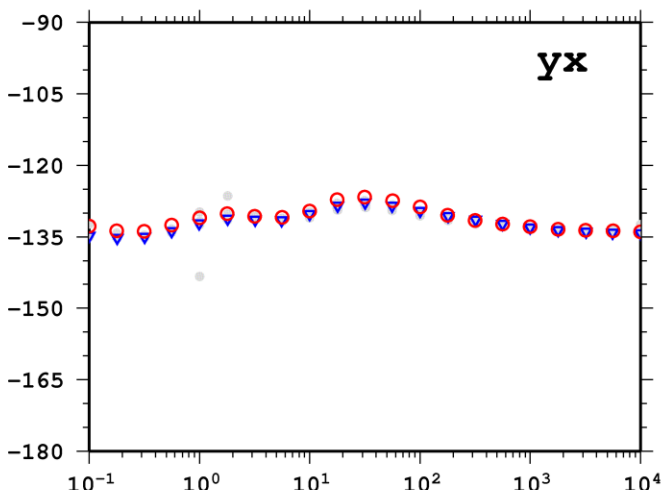
Phase



Phase

- ▼ EG3DTMT
- Antje Franke

Phase



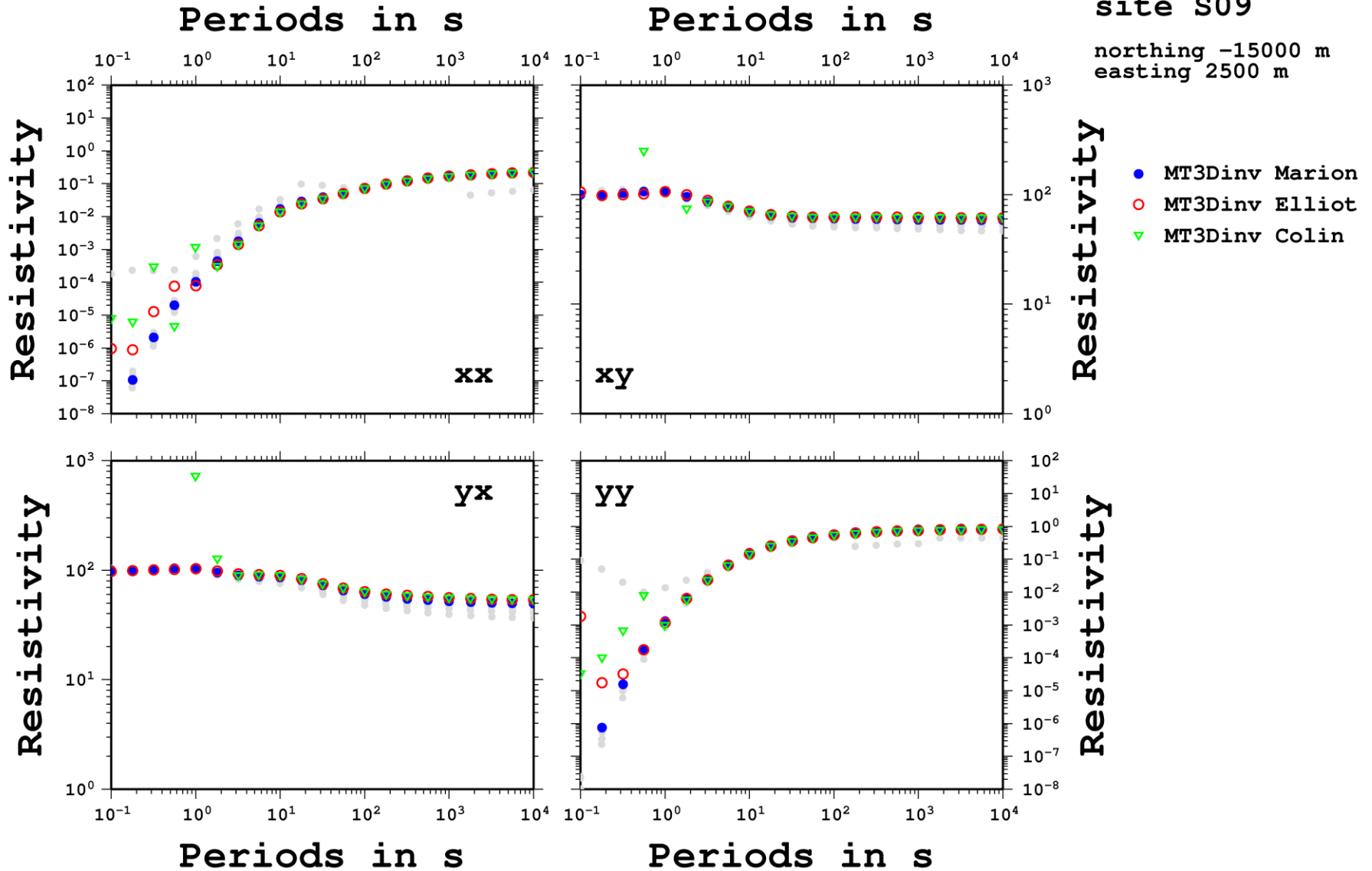
Phase

Periods in s

Periods in s

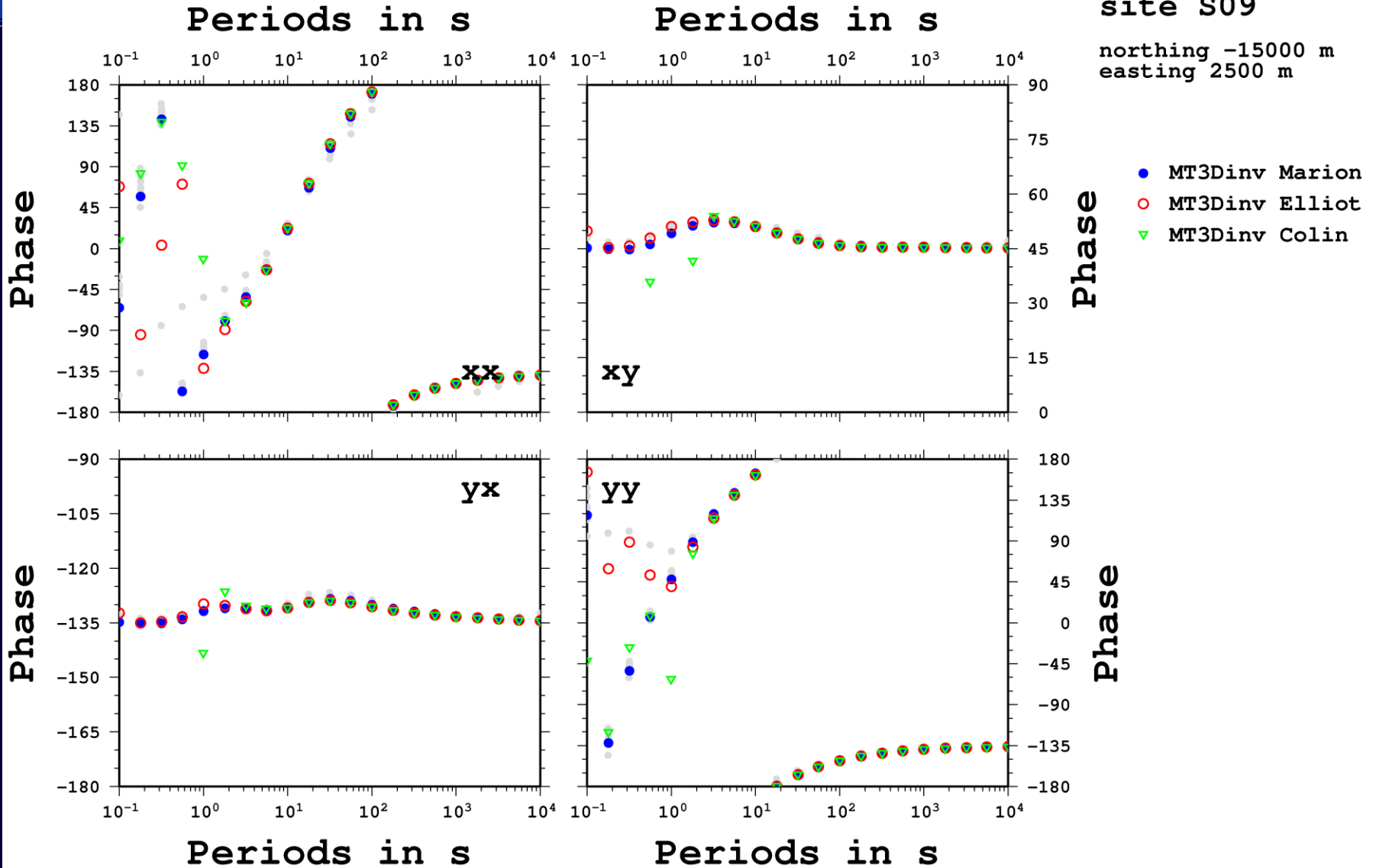
site S09

northing -15000 m
easting 2500 m



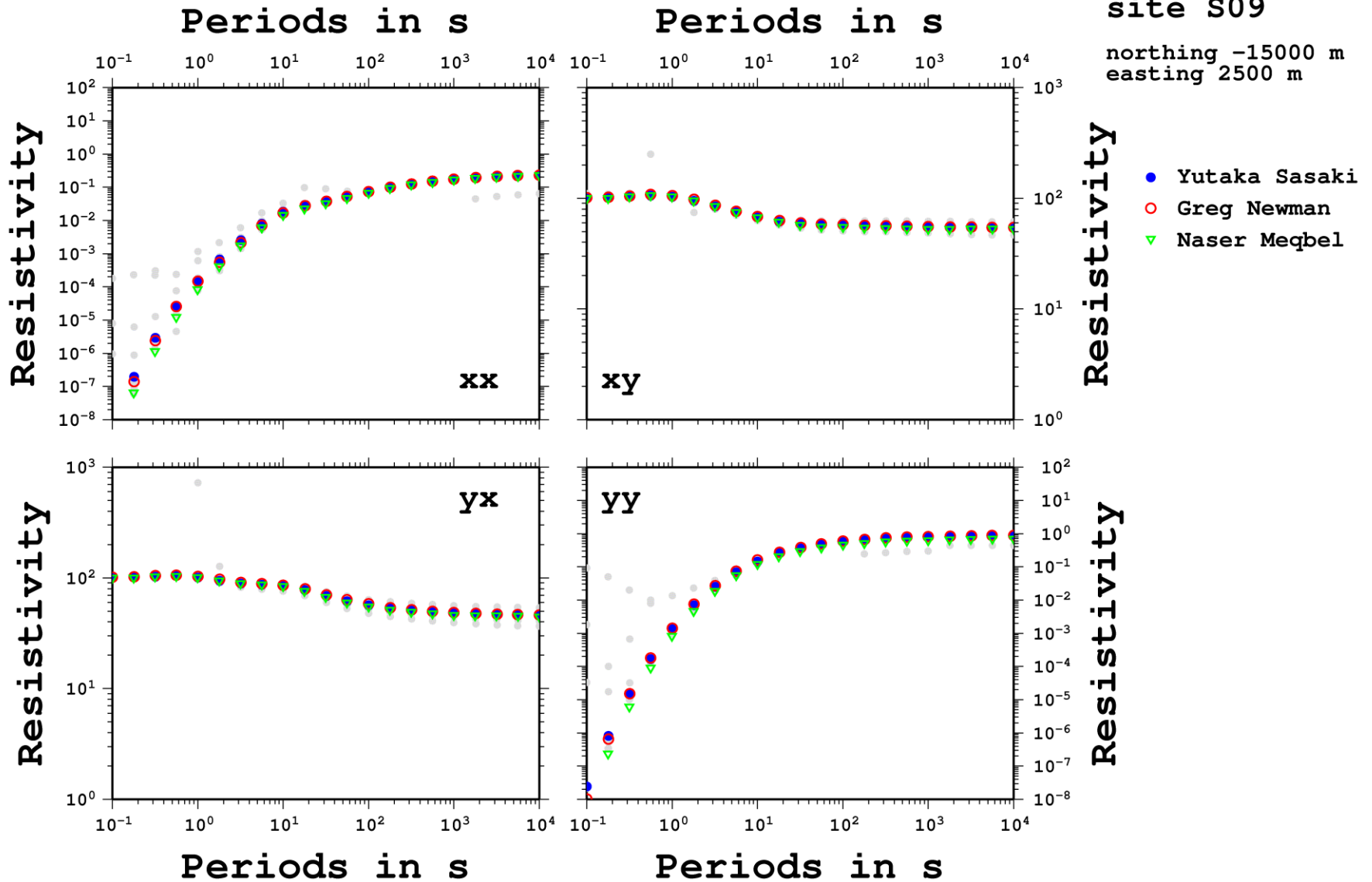
site S09

northing -15000 m
easting 2500 m



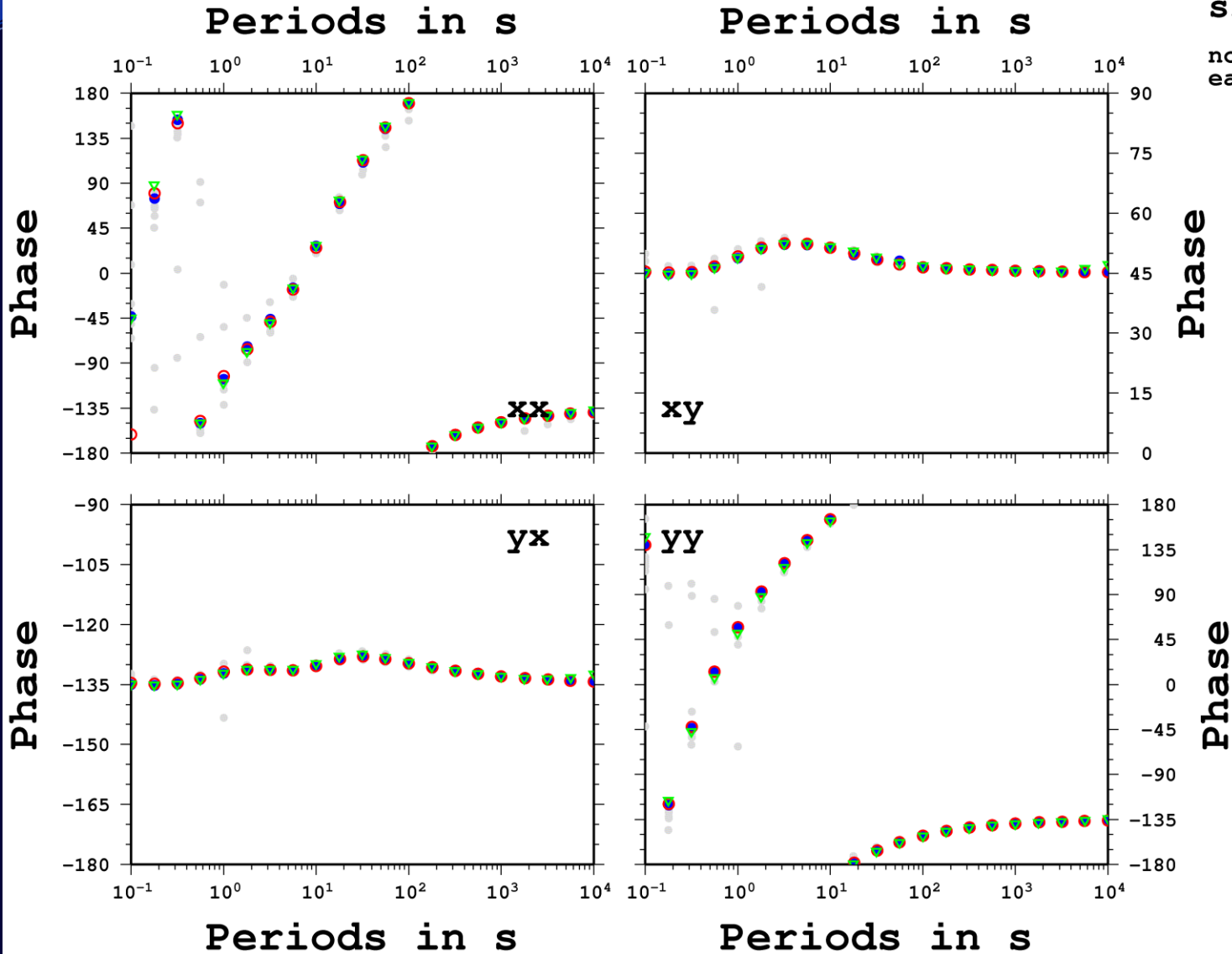
site S09

northing -15000 m
easting 2500 m



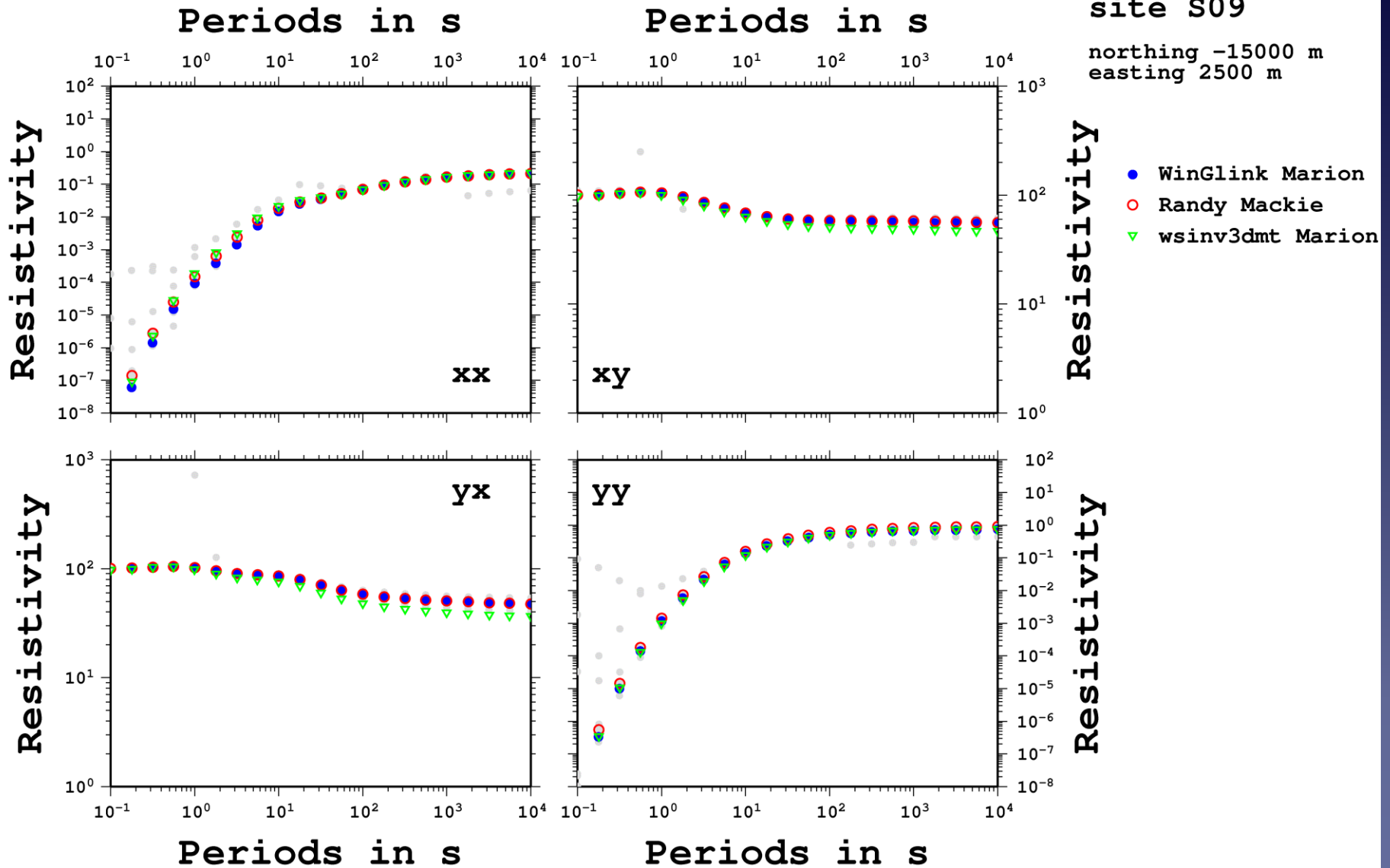
site S09

northing -15000 m
easting 2500 m



site S09

northing -15000 m
easting 2500 m



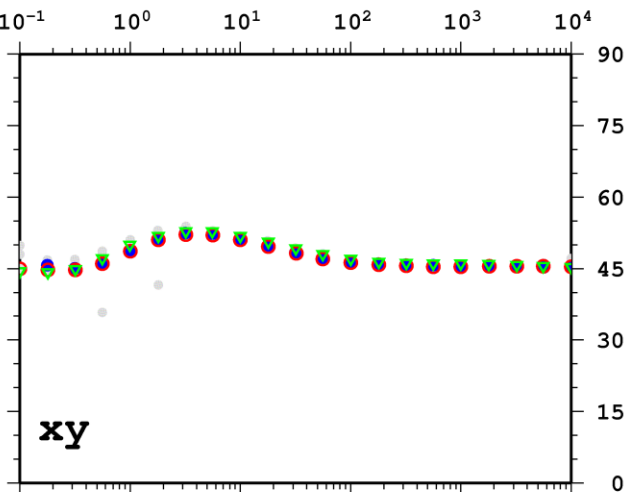
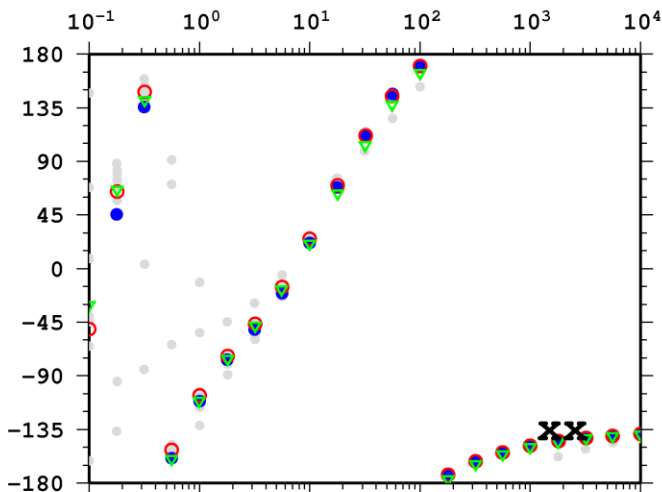
Periods in s

Periods in s

site S09

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easting 2500 m

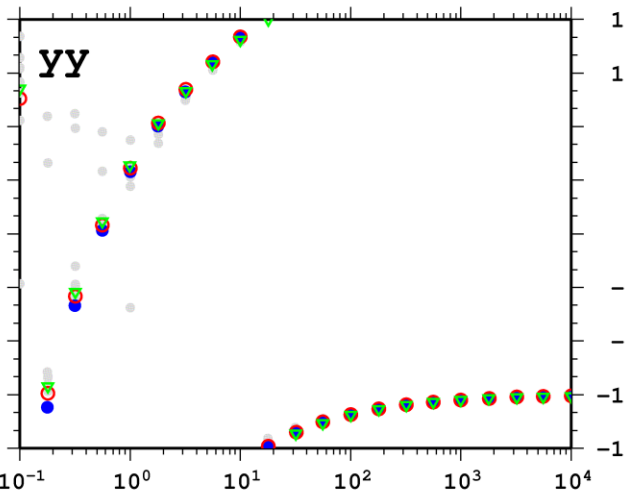
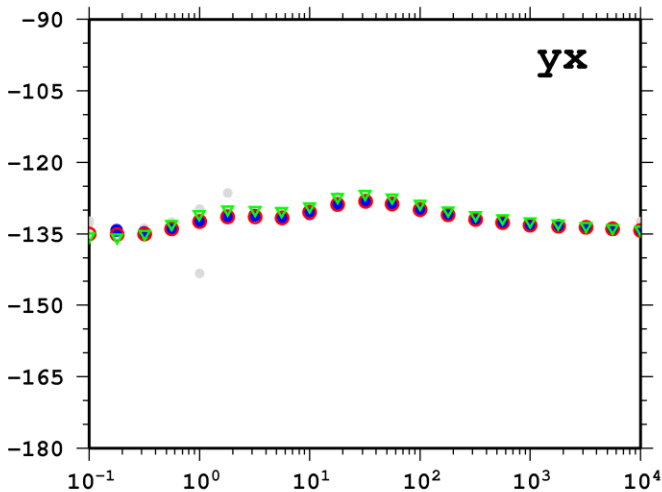
Phase



Phase

- WinGlink Marion
- Randy Mackie
- ▼ wsinv3dmt Marion

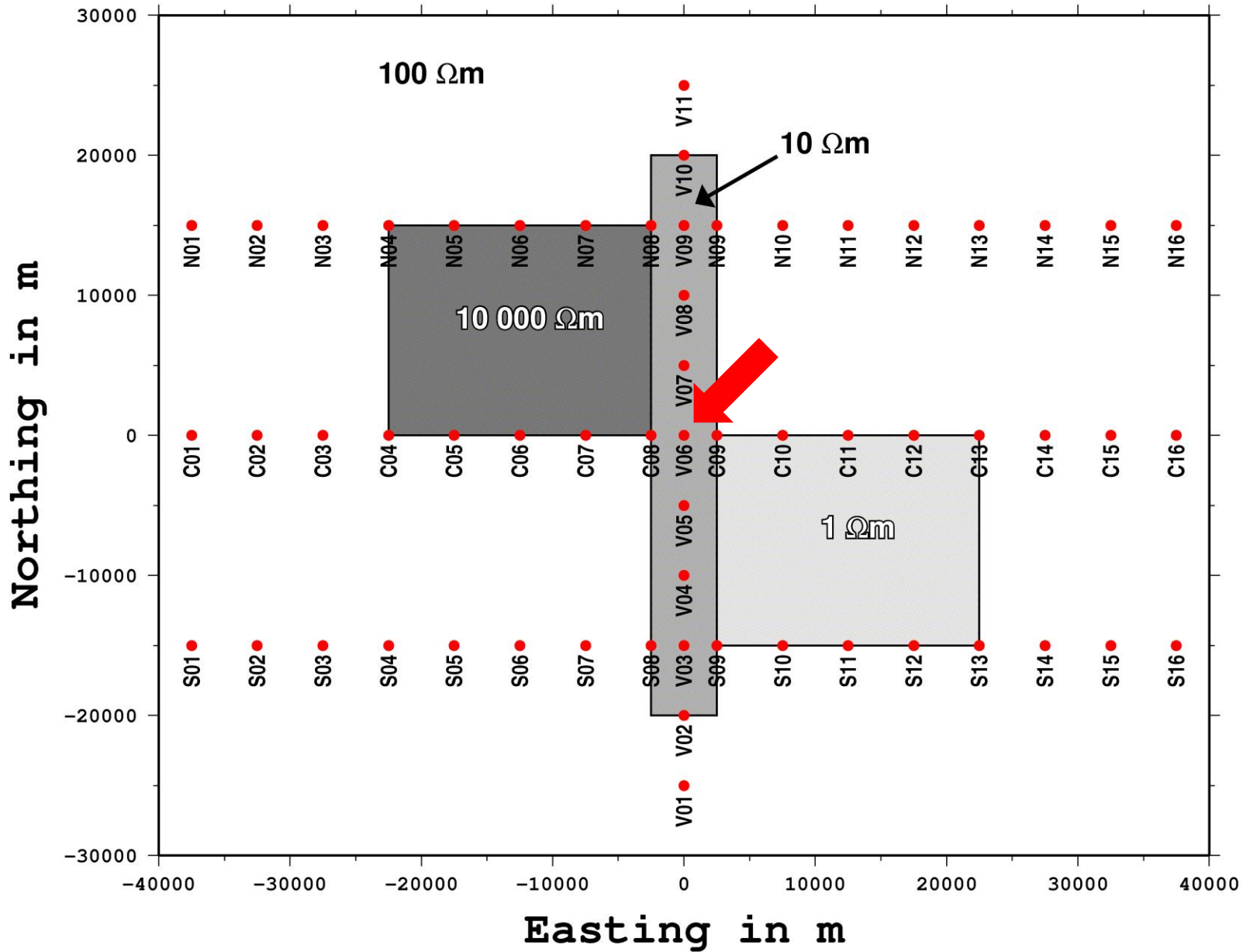
Phase



Phase

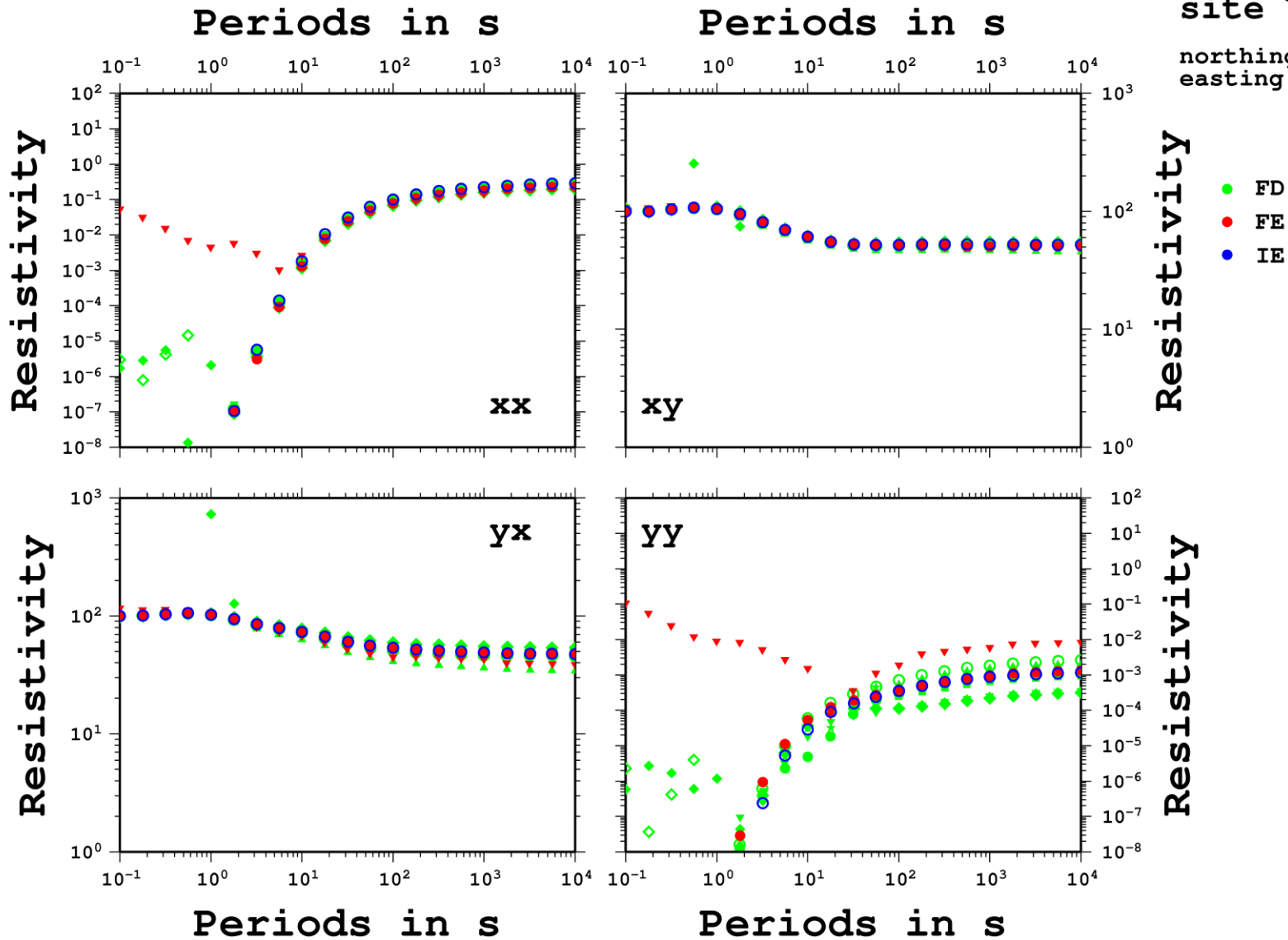
Periods in s

Periods in s



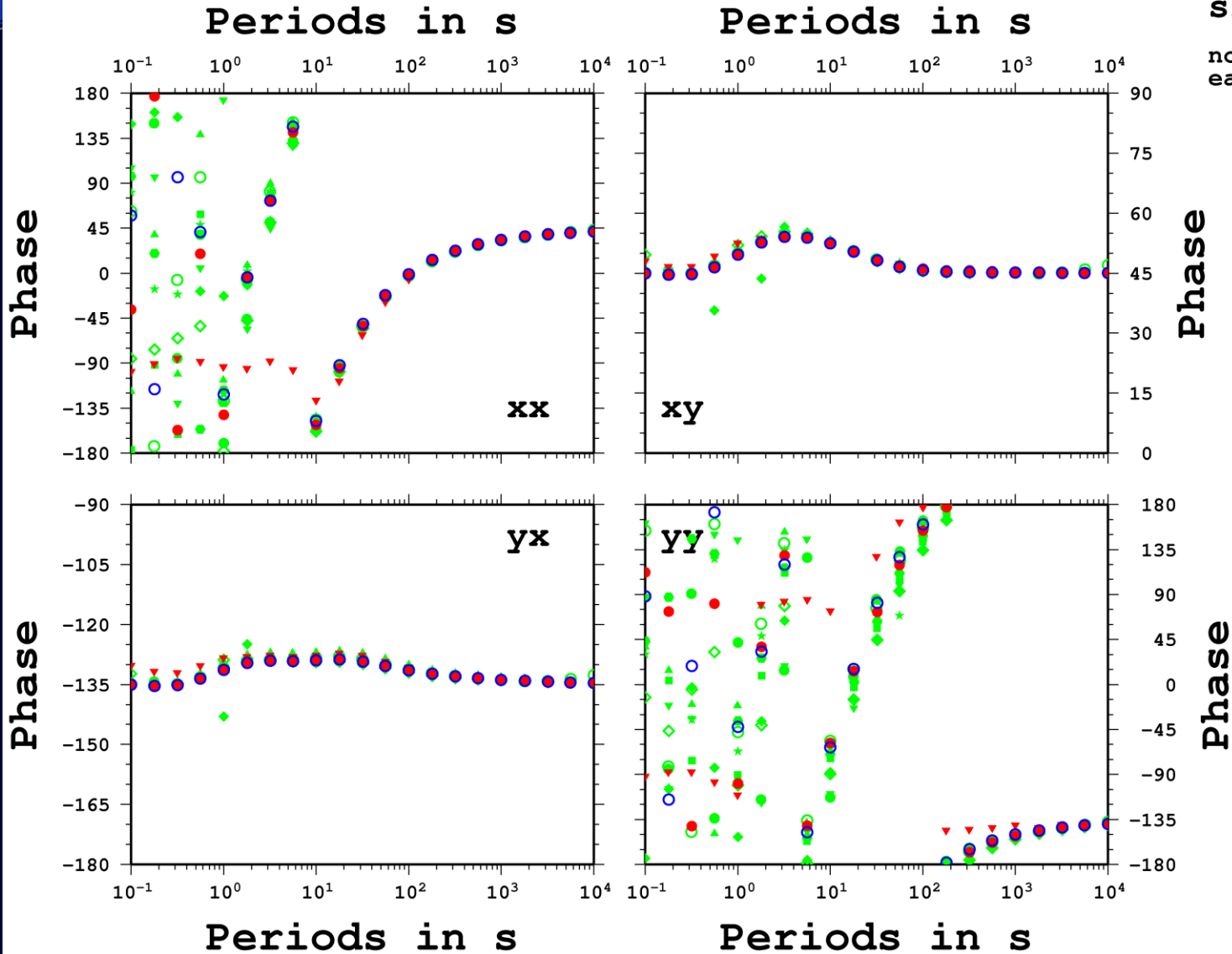
site V06

northing 0 m
easting 0 m



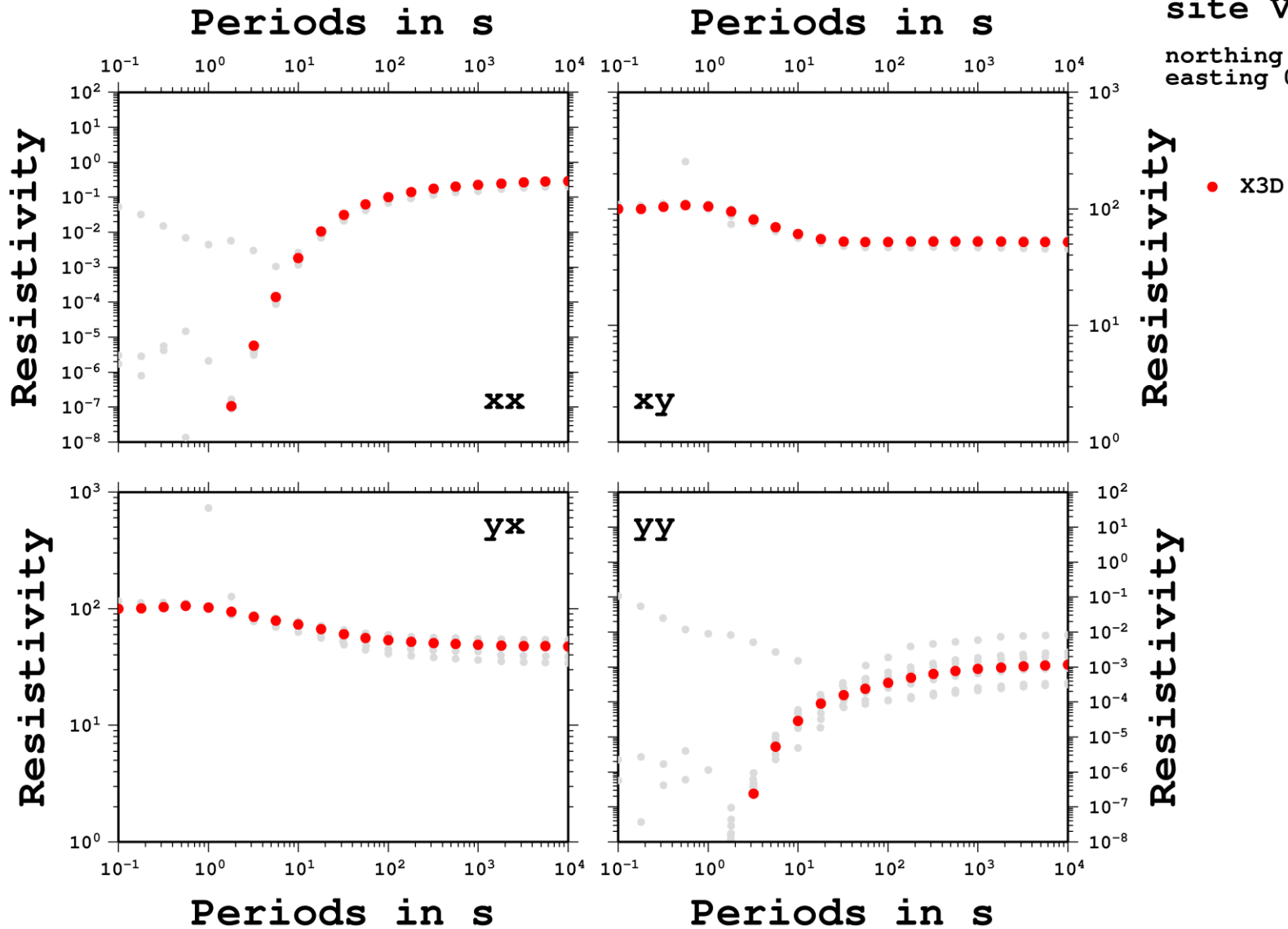
site V06

northing 0 m
easting 0 m



site V06

northing 0 m
easting 0 m



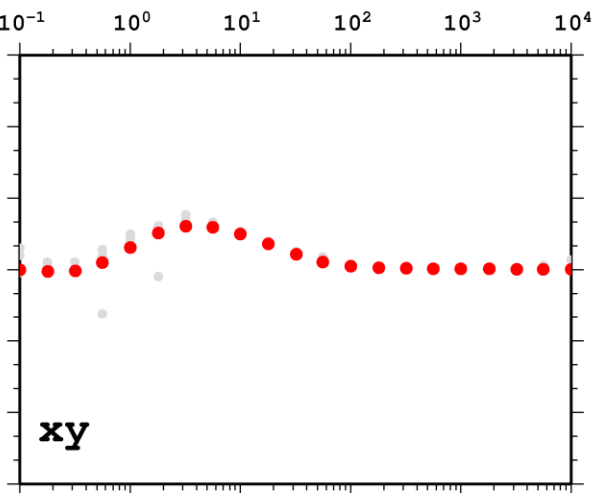
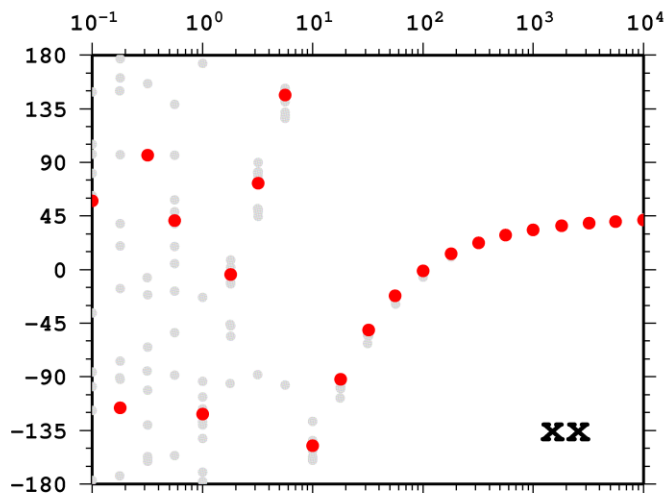
Periods in s

Periods in s

site V06

northing 0 m
easting 0 m

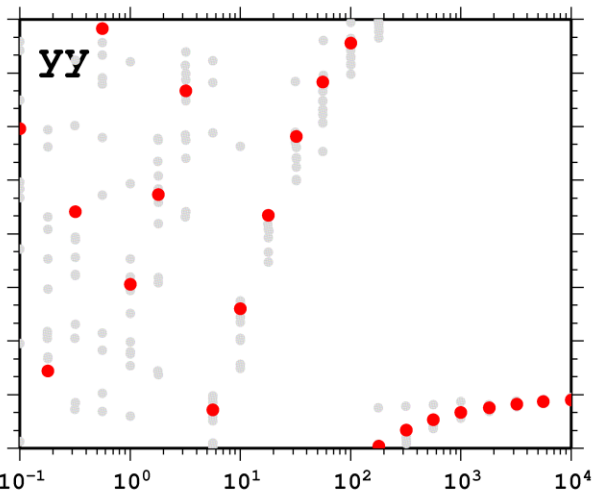
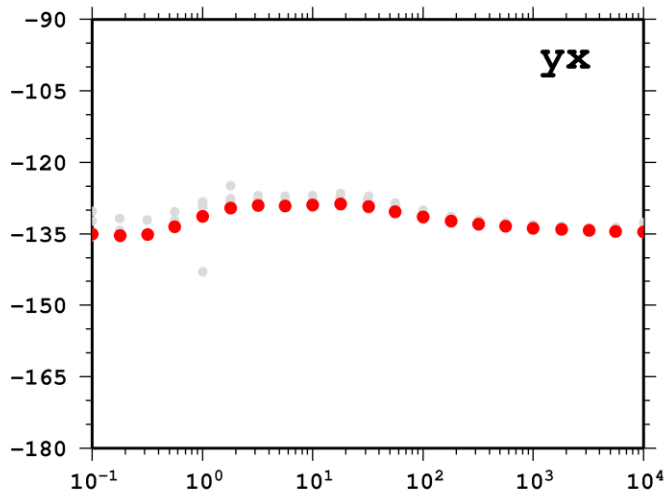
Phase



Phase

● X3D

Phase



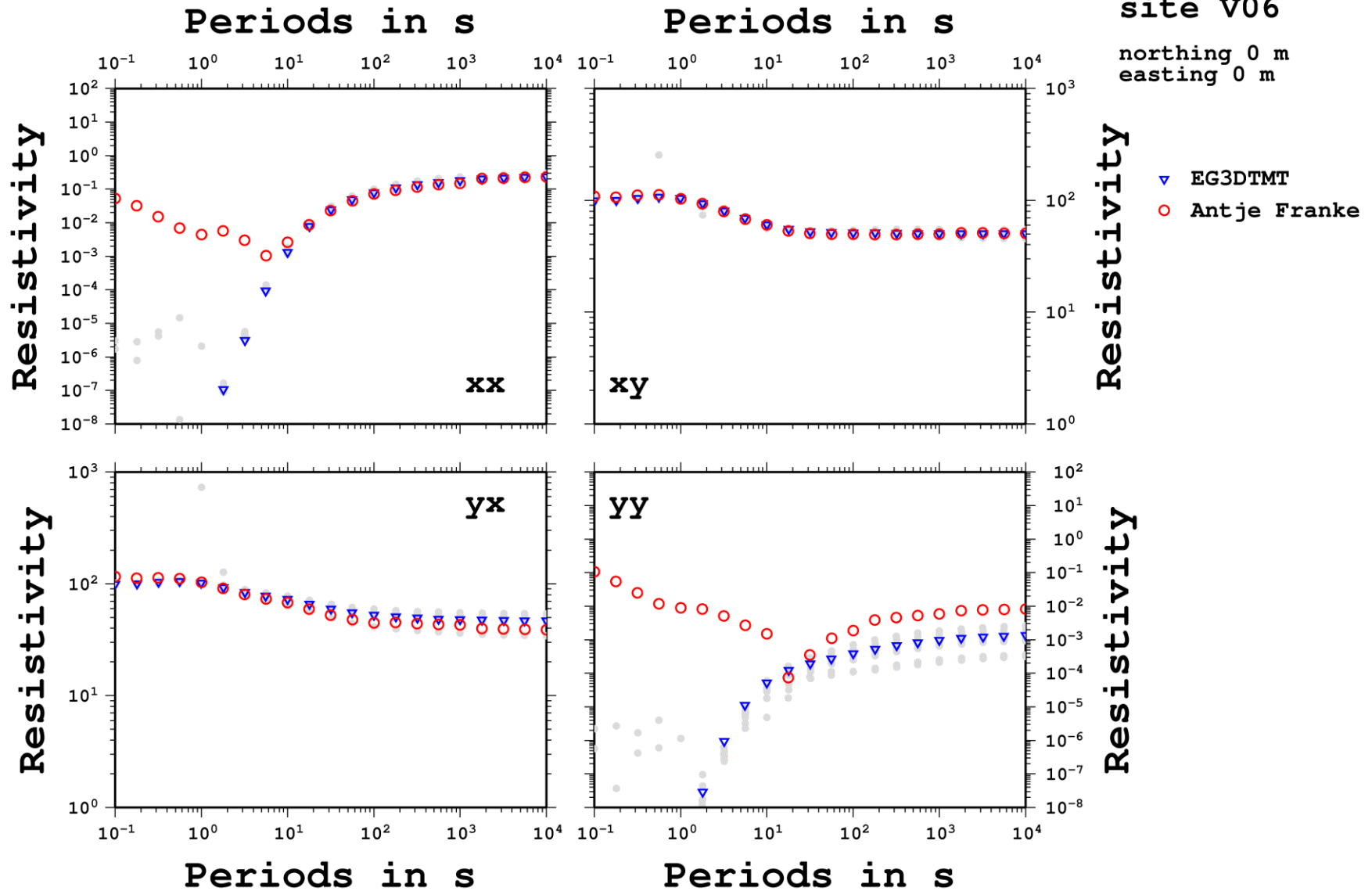
Phase

Periods in s

Periods in s

site V06

northing 0 m
easting 0 m



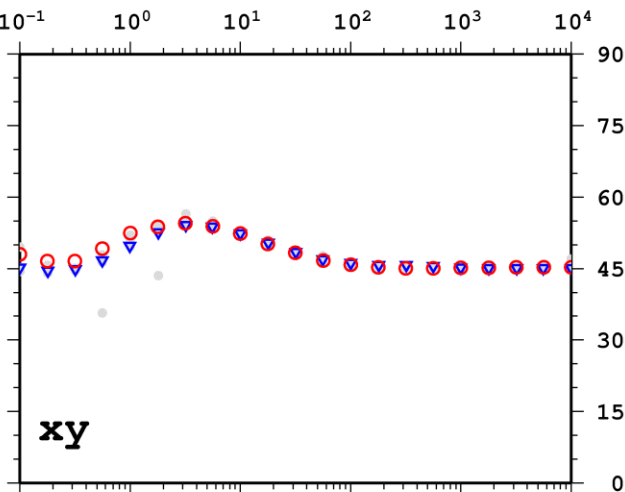
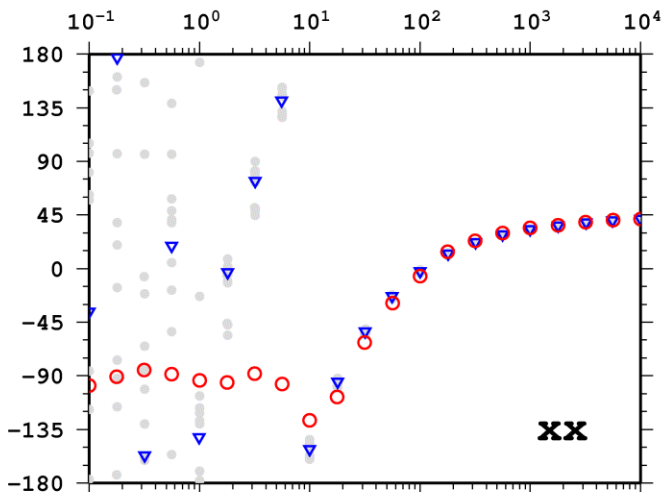
Periods in s

Periods in s

site V06

northing 0 m
easting 0 m

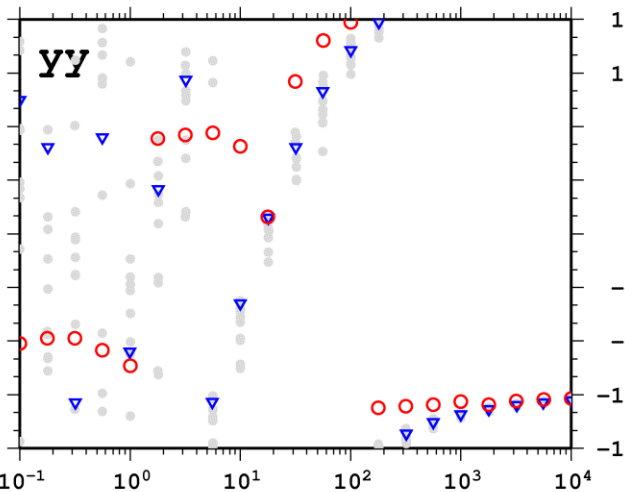
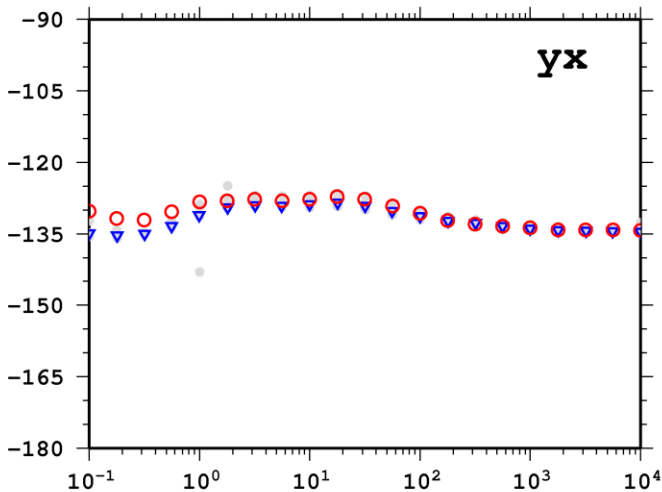
Phase



Phase

- ▼ EG3DTMT
- Antje Franke

Phase



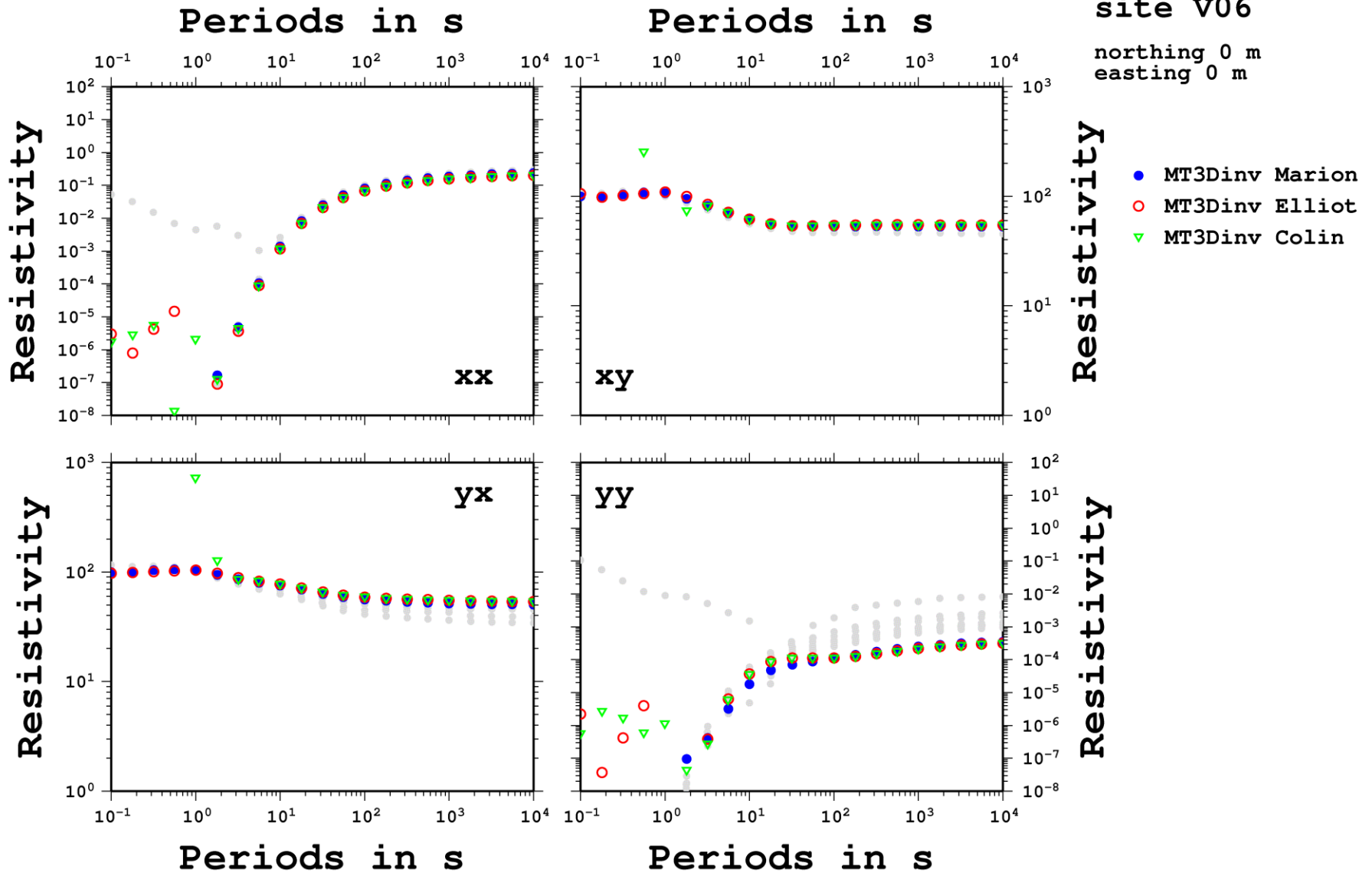
Phase

Periods in s

Periods in s

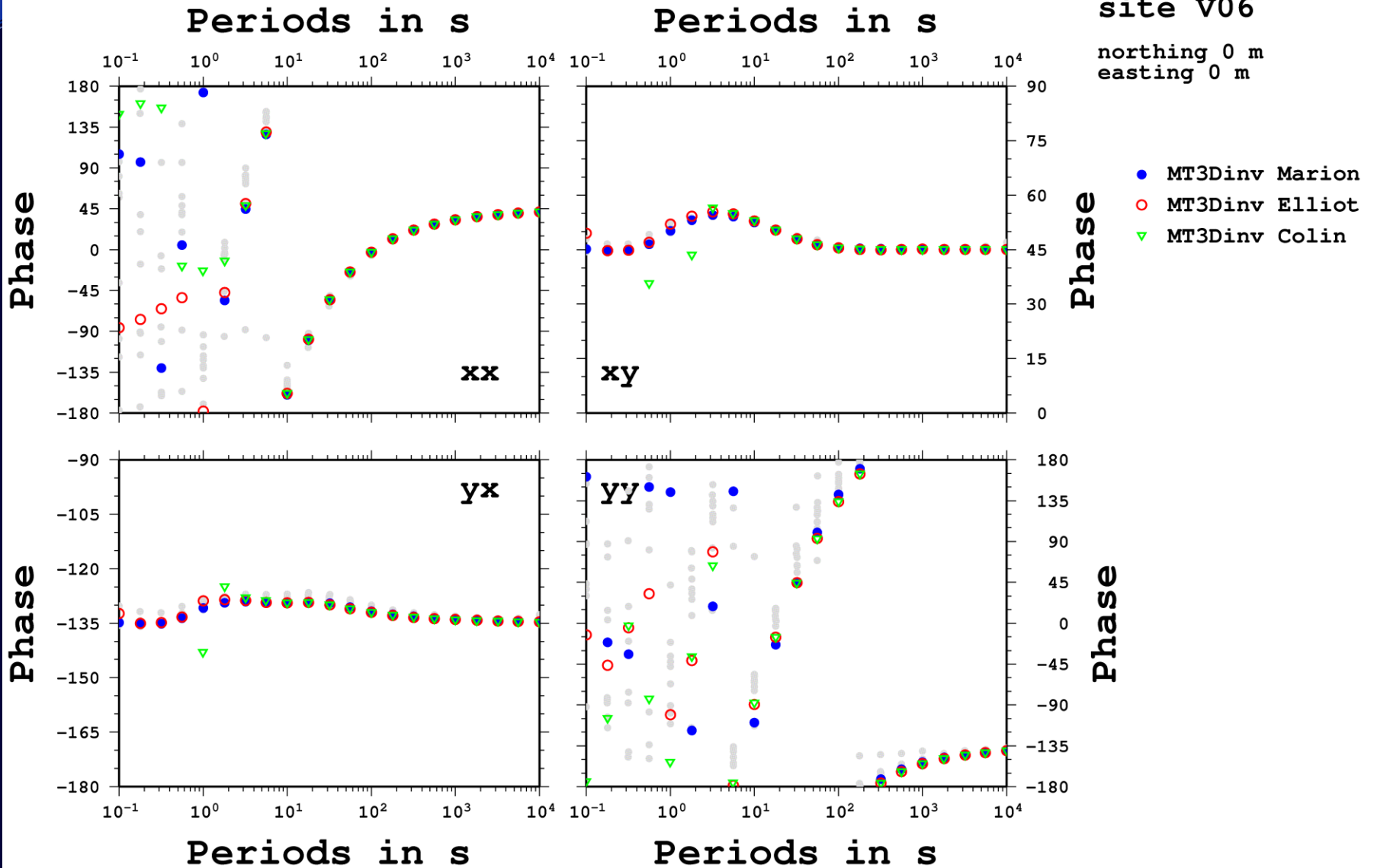
site V06

northing 0 m
easting 0 m



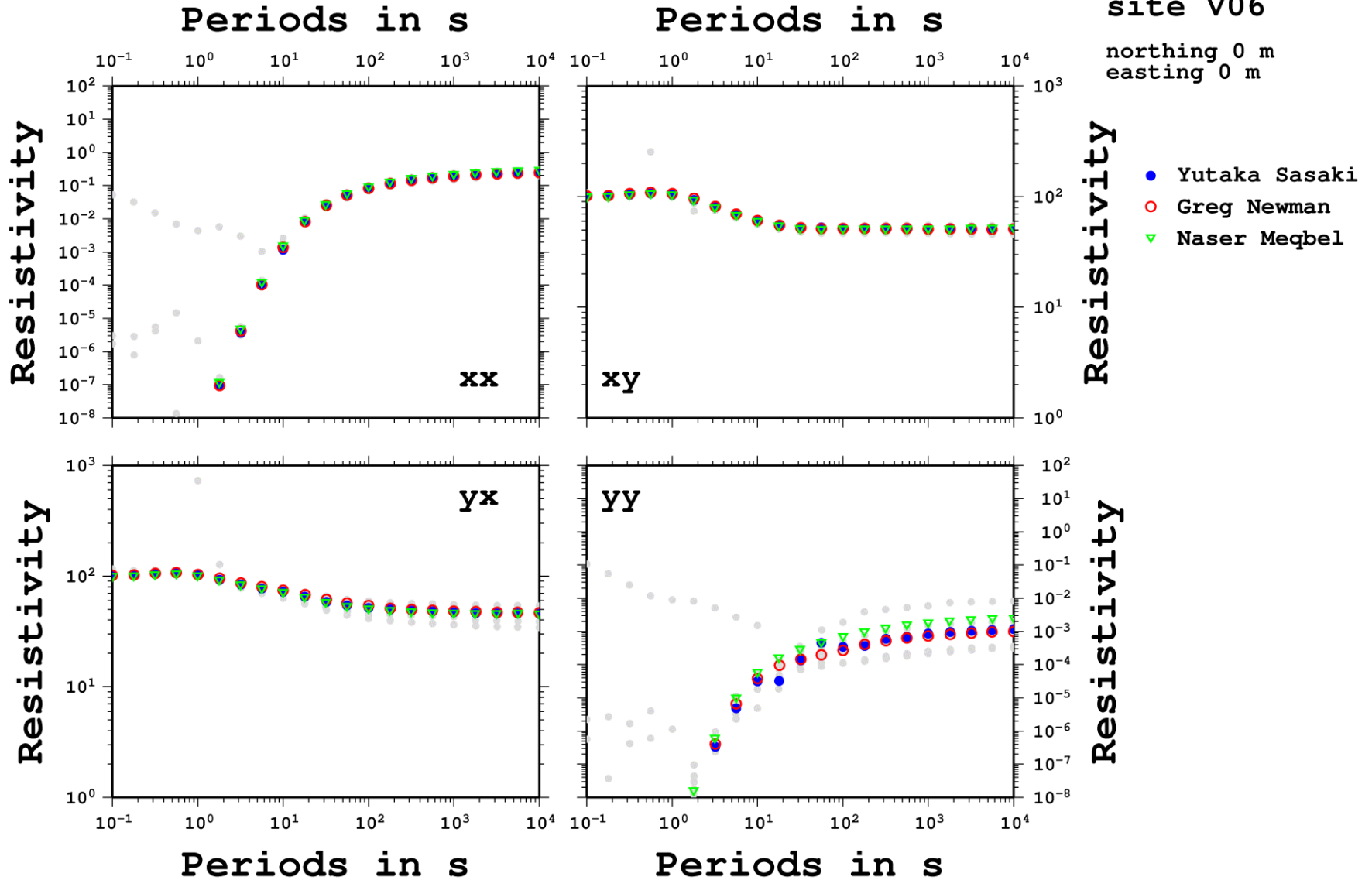
site V06

northing 0 m
easting 0 m



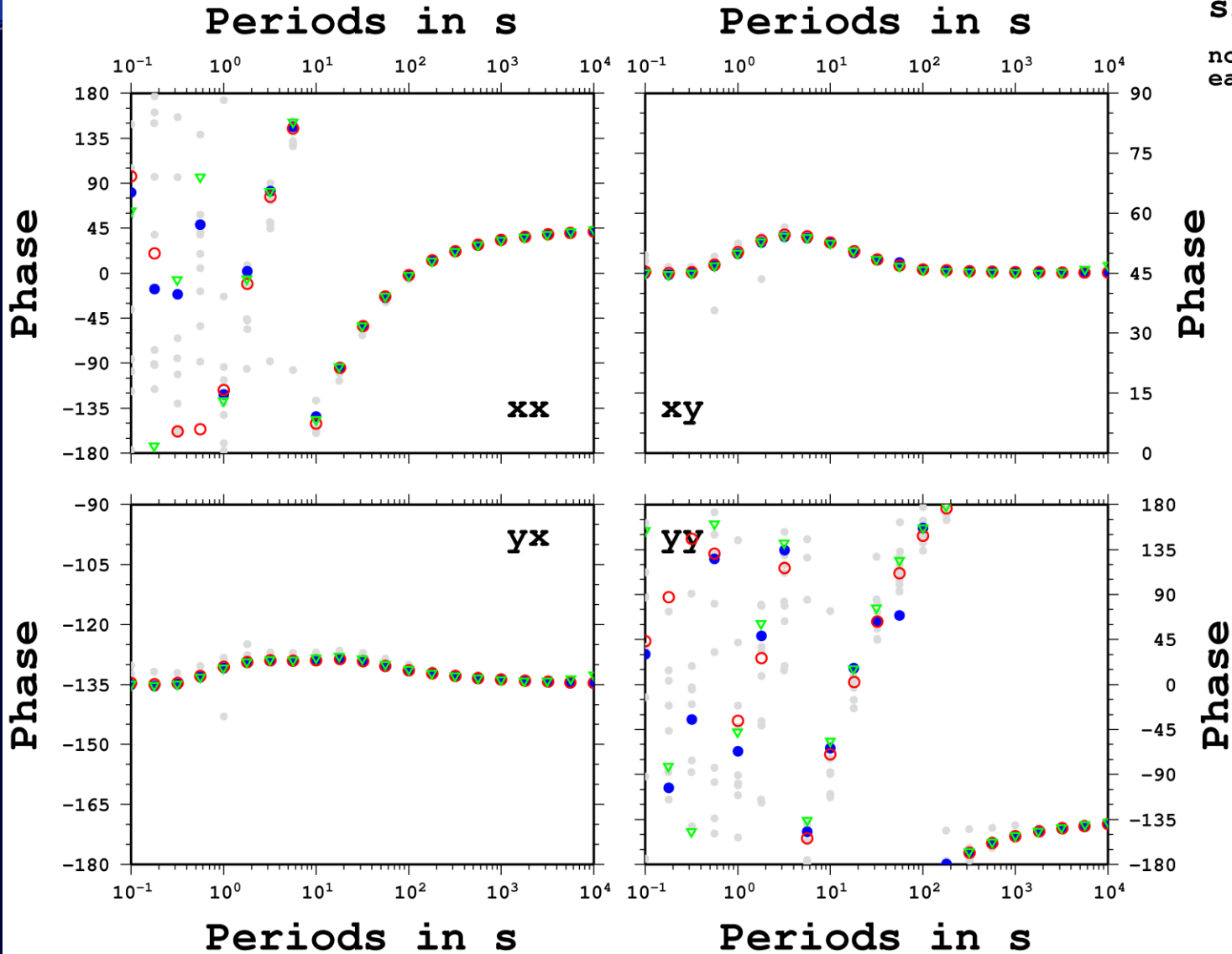
site V06

northing 0 m
easting 0 m



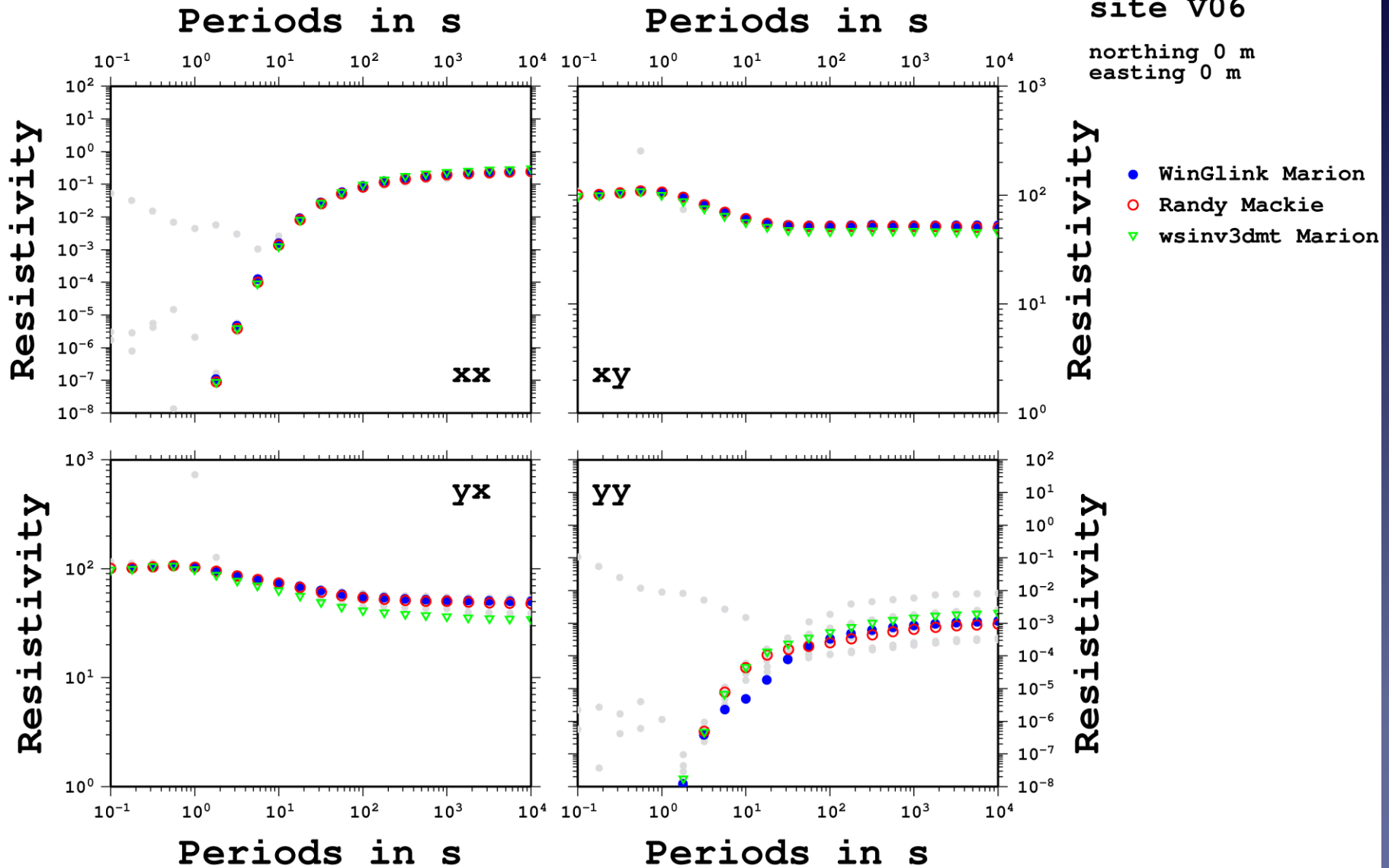
site V06

northing 0 m
easting 0 m



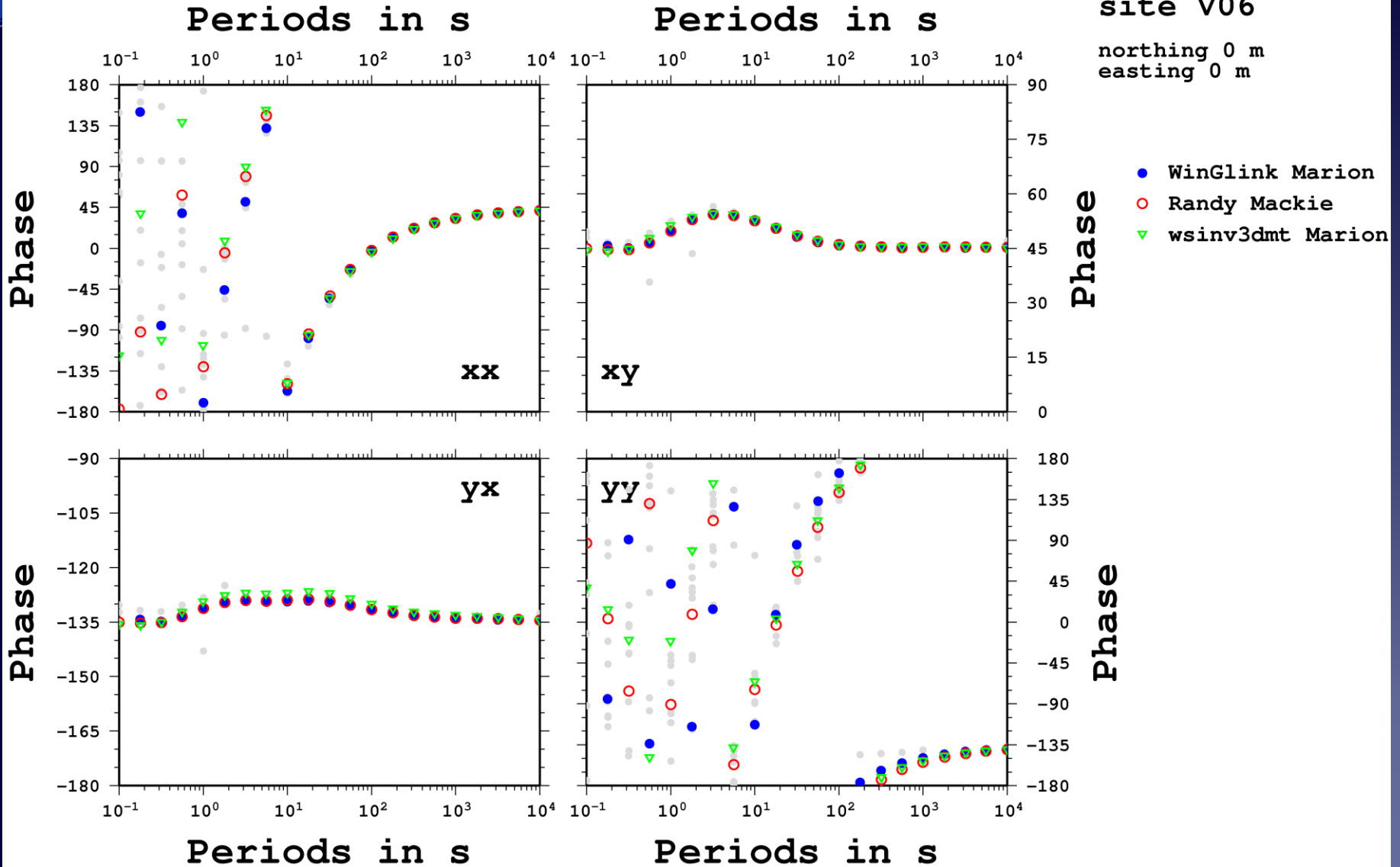
site V06

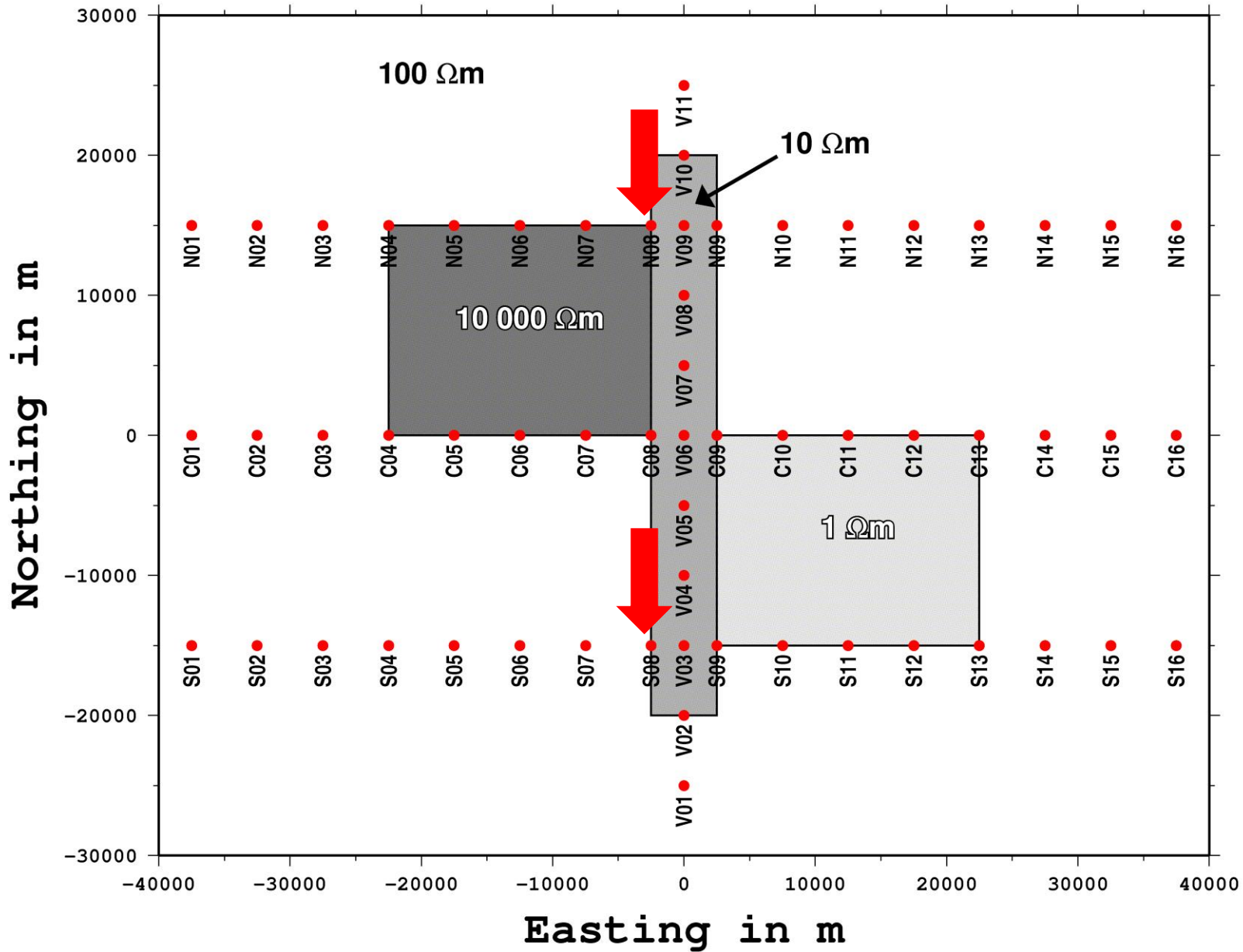
northing 0 m
easting 0 m



site V06

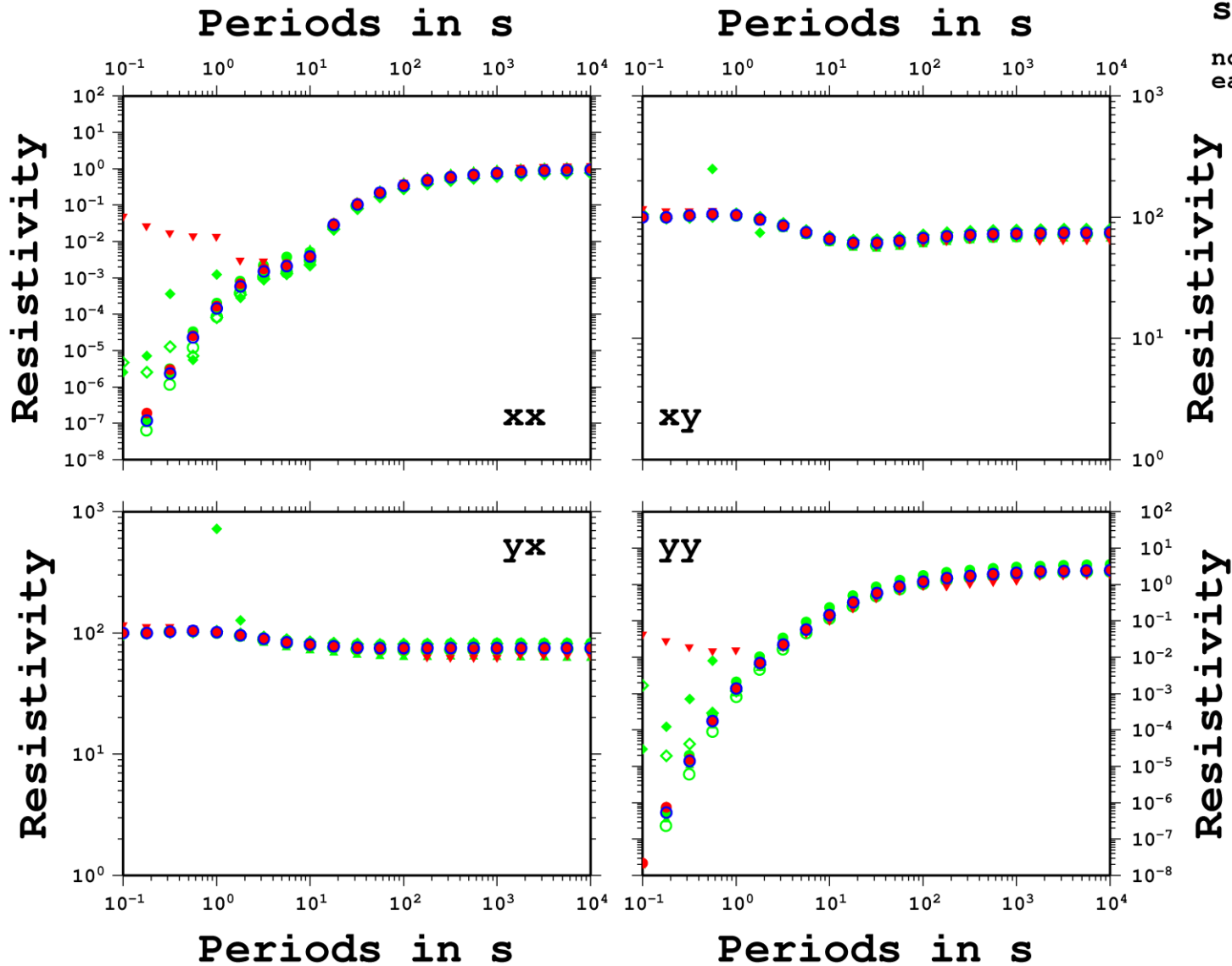
northing 0 m
easting 0 m





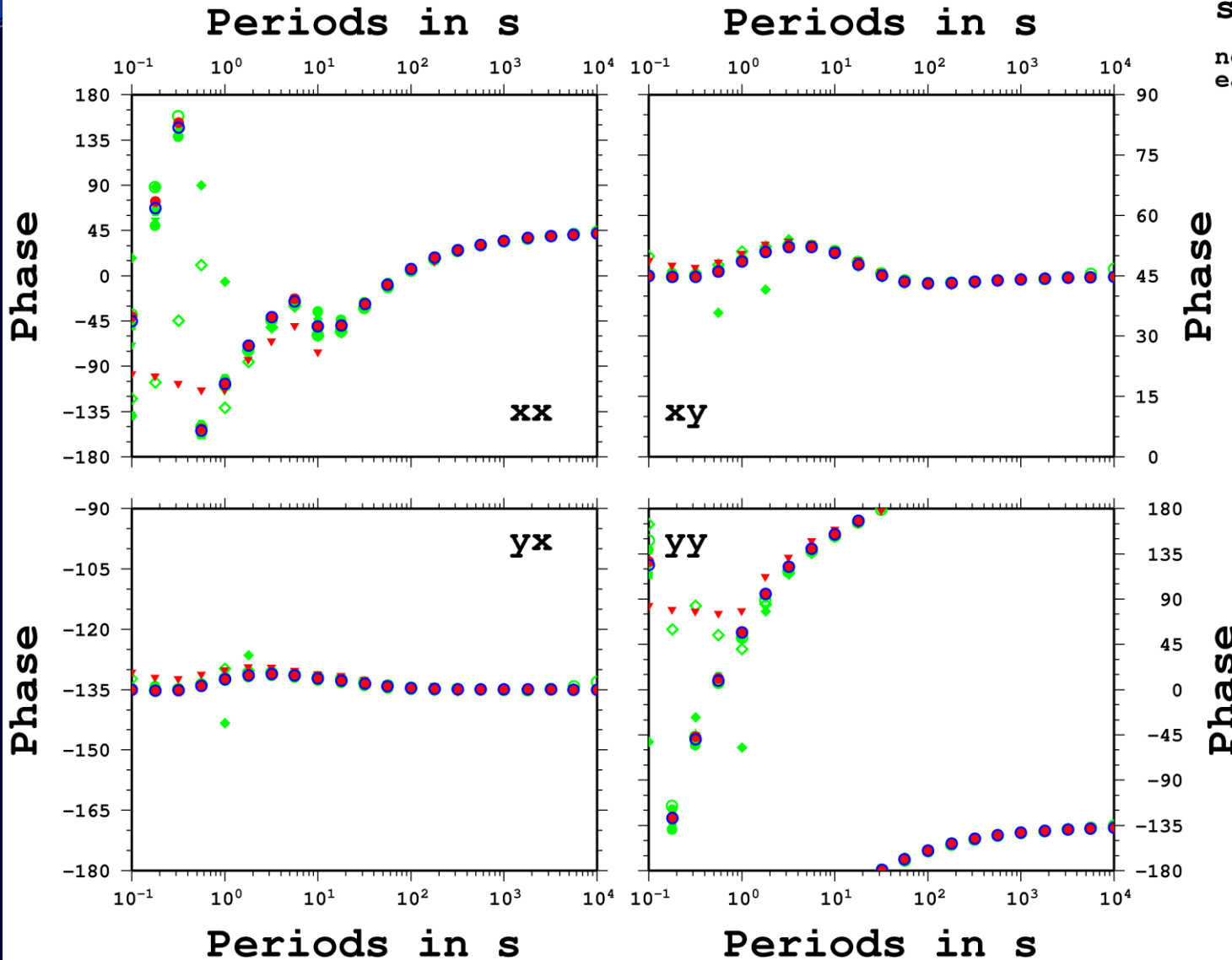
site N08

northing 15000 m
easting -2500 m



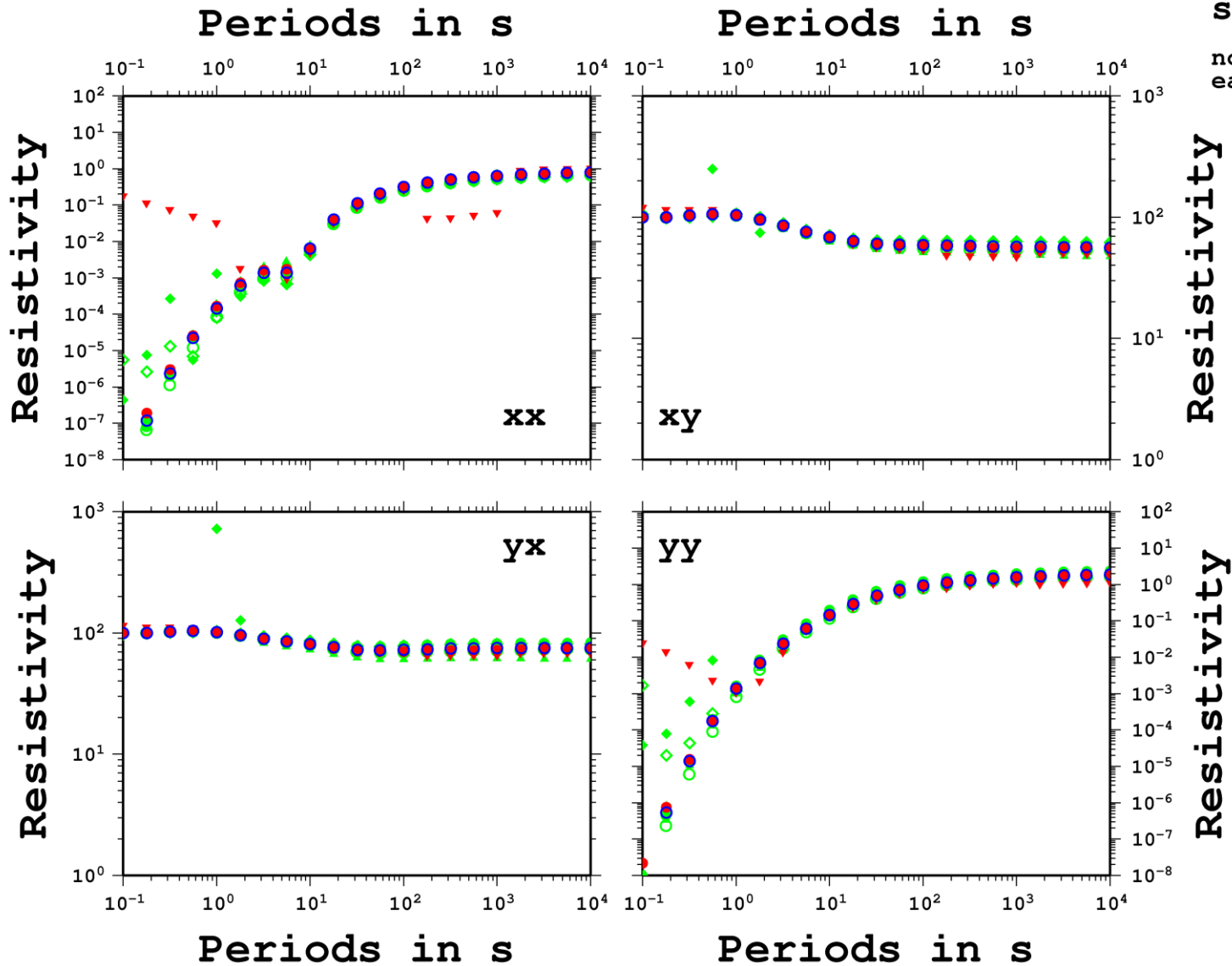
site N08

northing 15000 m
easting -2500 m



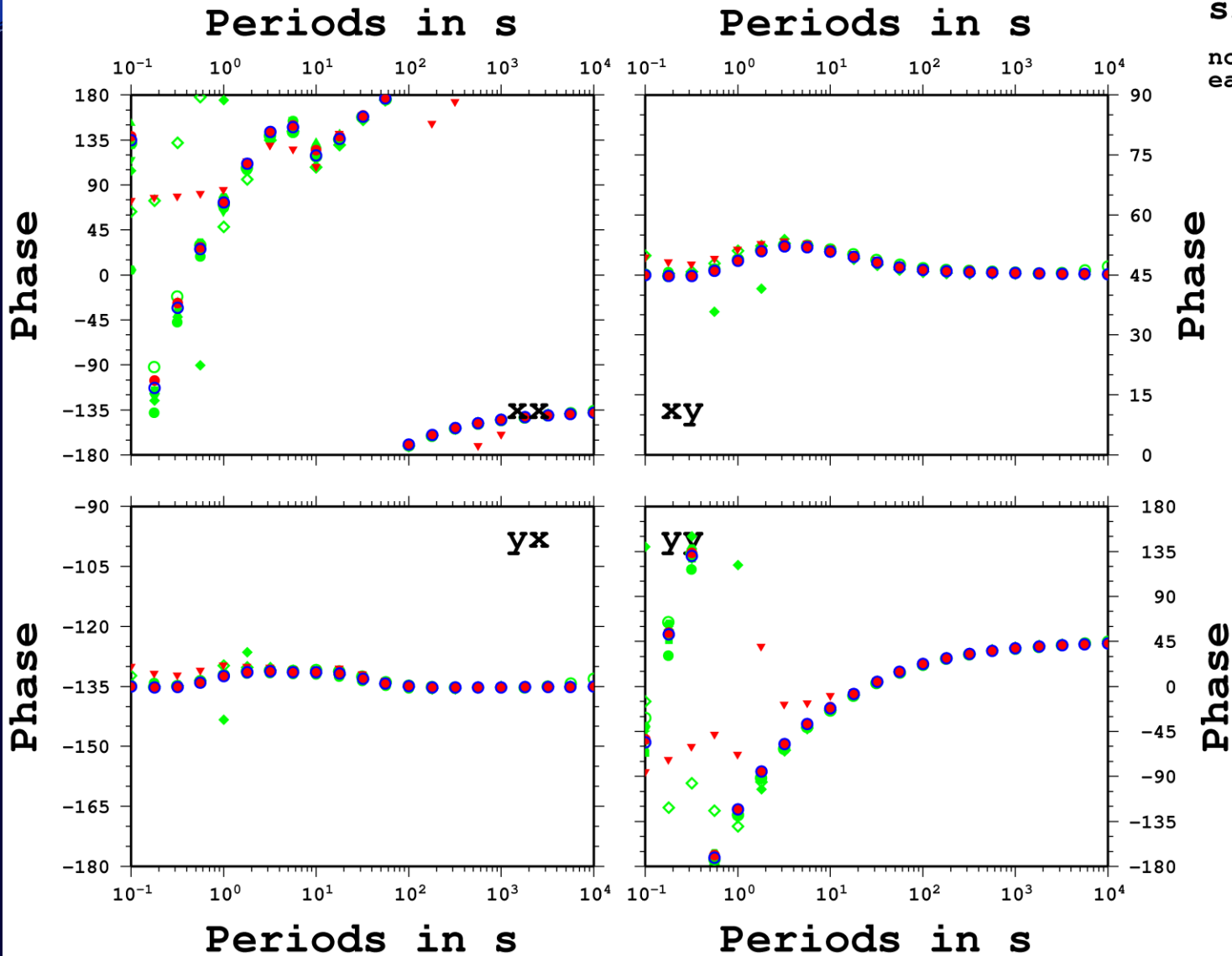
site S08

northing -15000 m
easting -2500 m



site S08

northing -15000 m
easting -2500 m



Conclusion

- **For comparison it is important:**
 - to get the sign of the time dependence correct (use same convention)
 - to use the same units
 - to use the same coordinate system (know what kind of rotation etc. is needed)