Conventionally detected Tokai Slow Slip

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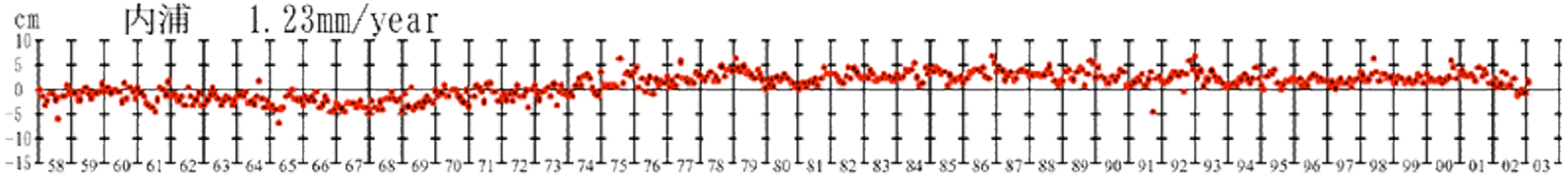
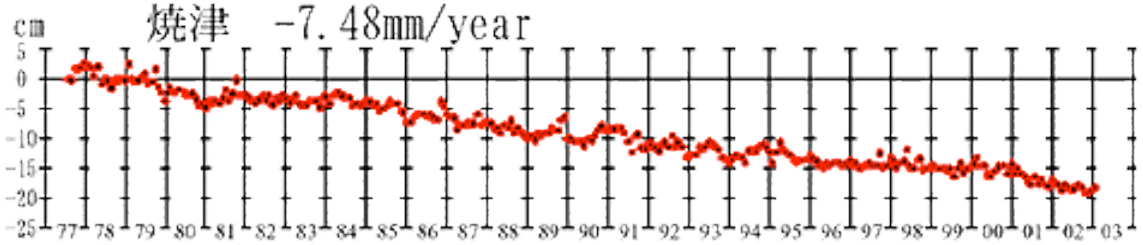
Slow slip should be mined in conventional data

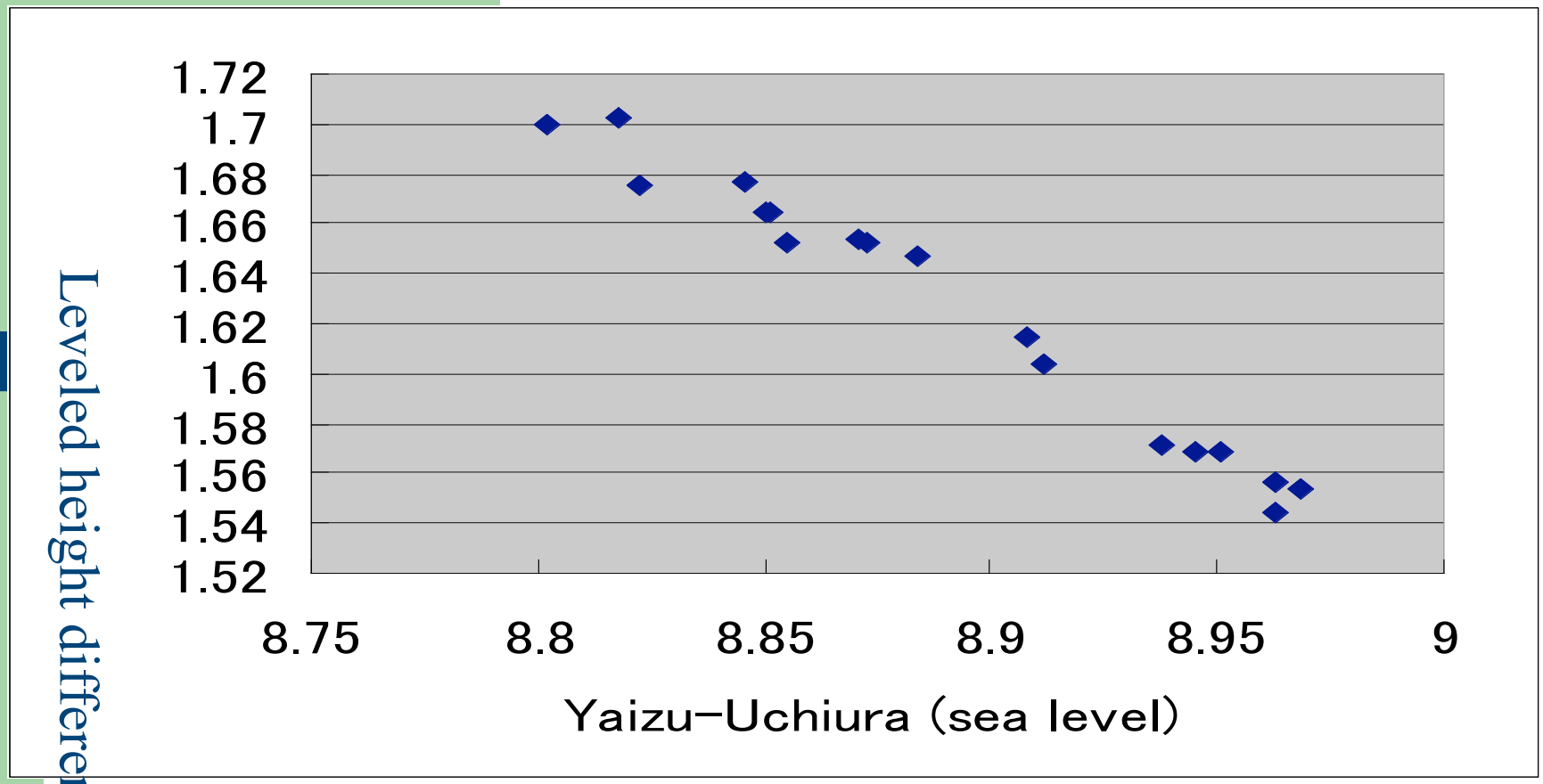
- In Tokai area, we have repeated EDM and leveling survey since 1977.
- Temporal evolution of deformation can be traced.

Leveling route

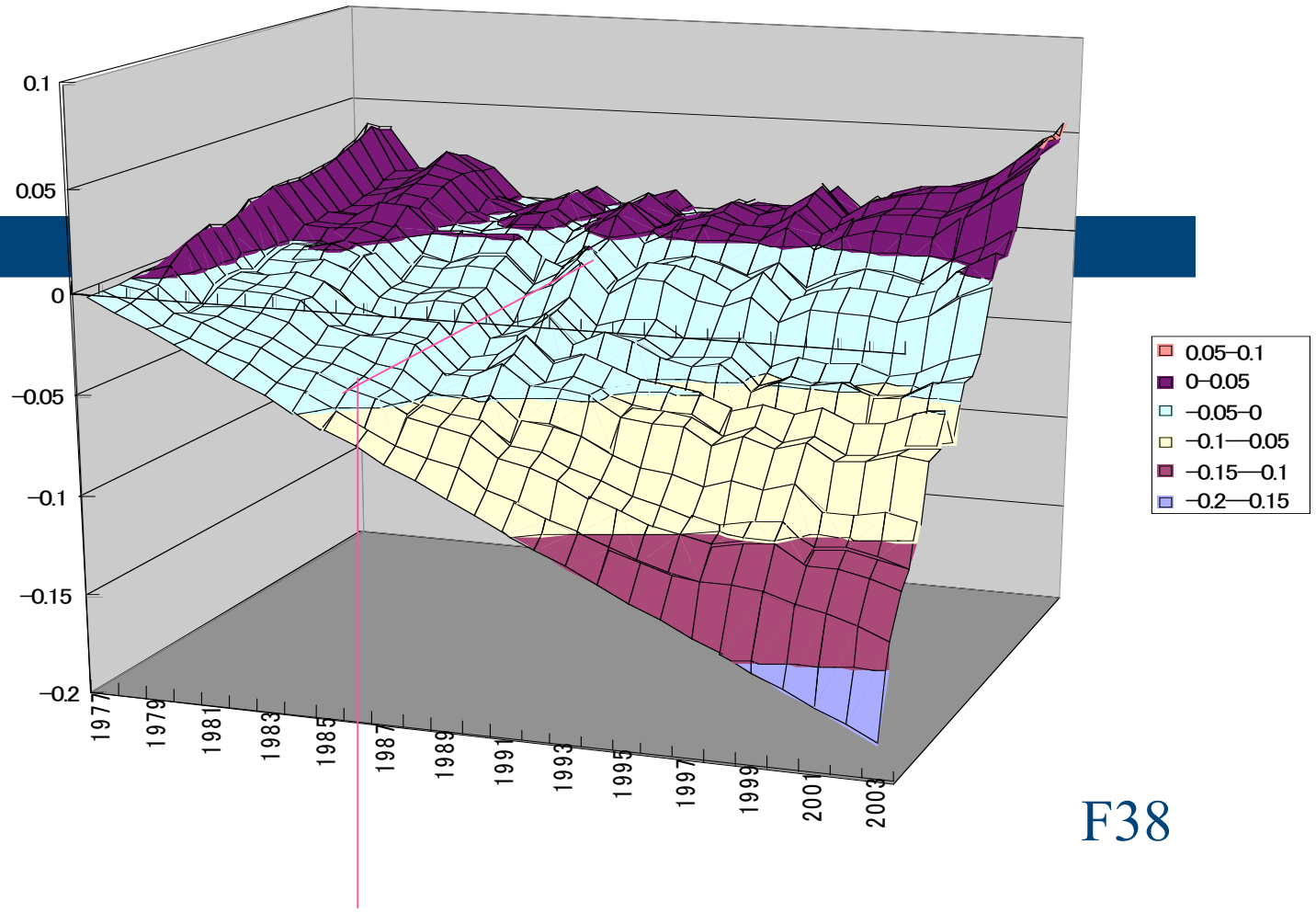
Uchiura is stable
Yaizu subside with constant rate



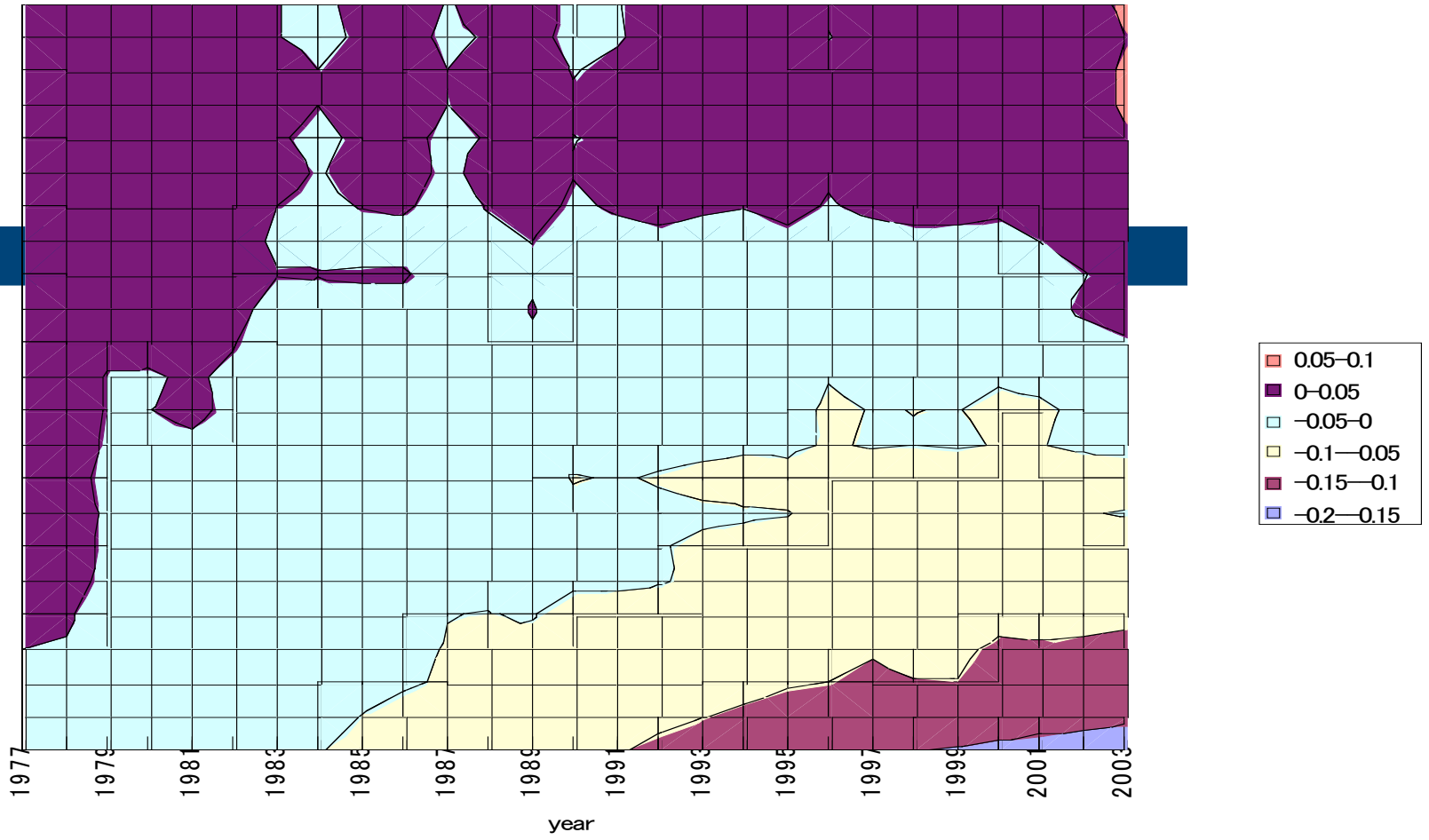


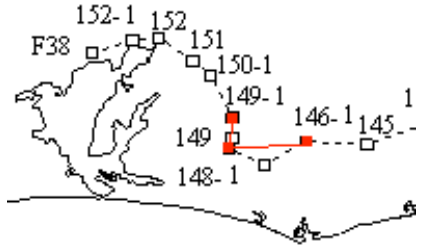


Assume that BM132 is subsiding with constant rate

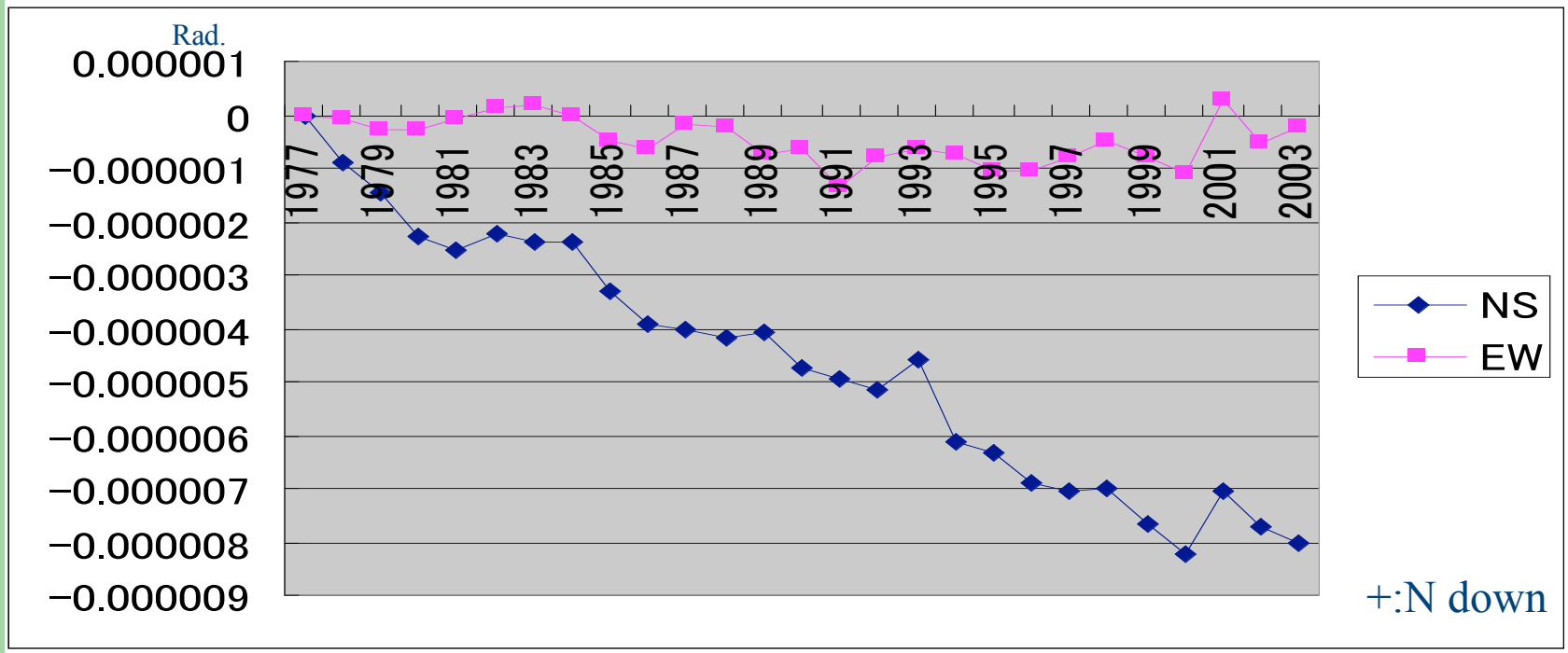

0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
0.05–0.1
0–0.05
−0.05–0
−0.1—0.05
−0.15—0.1
−0.2—0.15

F38

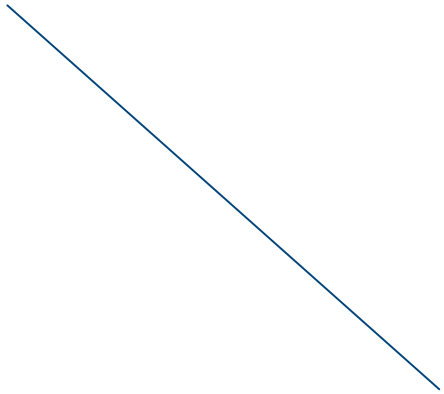

0.05–0.1
0–0.05
–0.05–0
–0.1—0.05
–0.15—0.1
–0.2—0.15
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
year



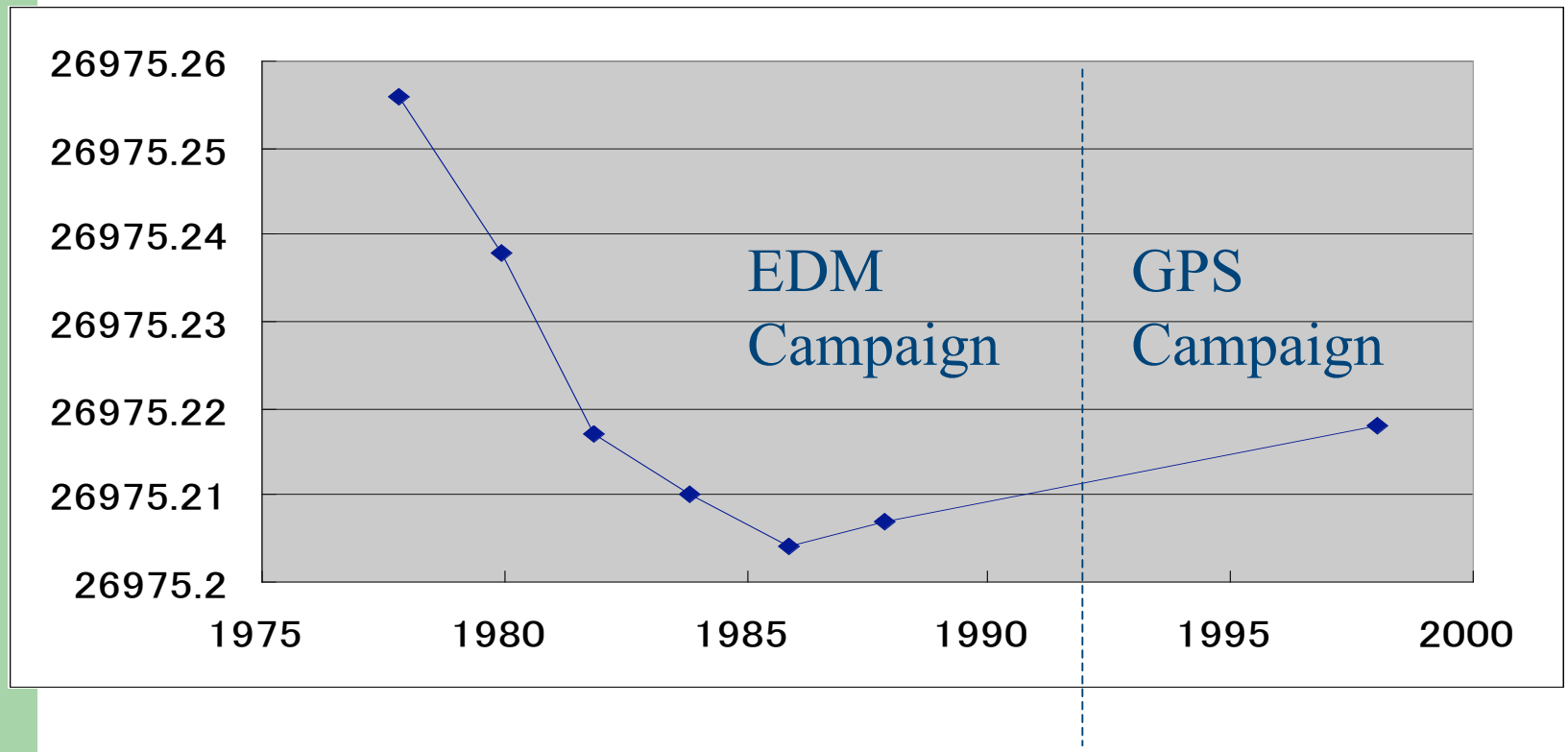
Ground tilt at Hamamatsu

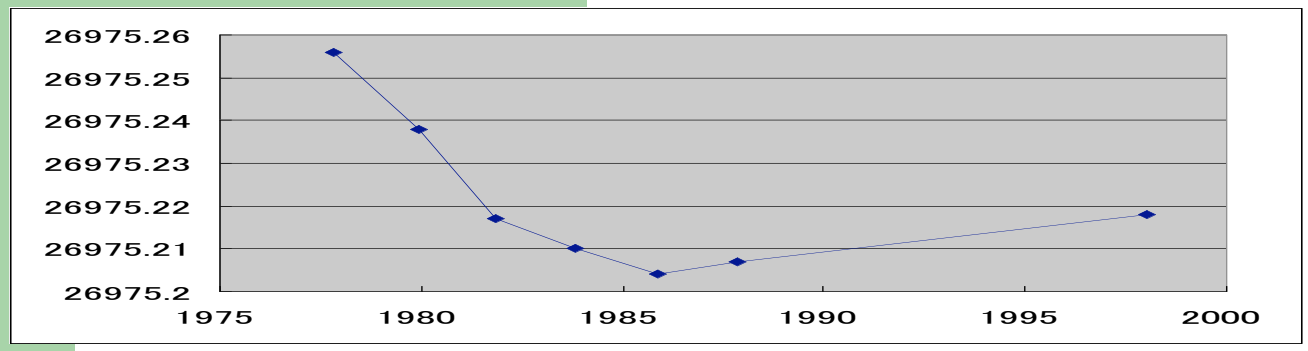


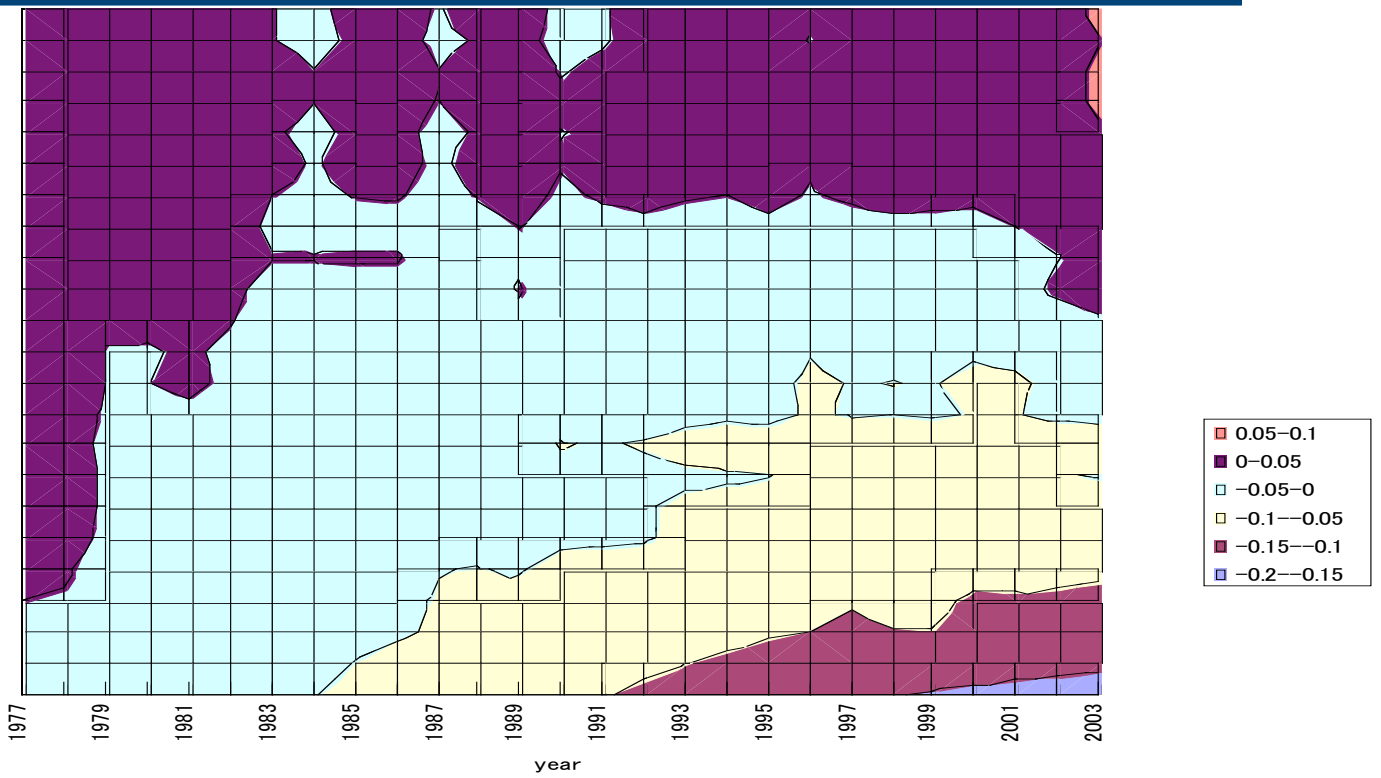
Distance measurement with EDM



Temporal change of distance




26975.26
26975.25
26975.24
26975.23
26975.22
26975.21
26975.2
1975
1980
1985
1990
1995
2000


0.05–0.1
0–0.05
–0.05–0
–0.1–-0.05
–0.15–-0.1
–0.2–-0.15
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
year

Characteristics of deformation

- Distance change and height change are correlated.
- Positive correlation suggests it is due to excess or shortage of mass (like that due to dislocation)
- Shortening of distance during 1978-1882 is about 1cm/year=-0.4 ppm/year
- At around 1986, expansion of subsiding area toward west ceased and uplifting area starts pushing back subsiding area toward east
- At around 2000 uplift of western part accelerated

What has happened in 1986?

- E up tilt suggests it is not due to simple retreat of strongly coupled area
- If decoupling beneath east of Hamanako-lake started, observed deformation is explained

Rapid deformation in 1977-1986

- Possibility 1: Last phase of after effect of 1944 Tonankai earthquake
- Possibility 2: Temporary strongly coupled
- Possibility 3: Slow slip in SE of the lake