



The First Austrian Velocity Field derived from GPS

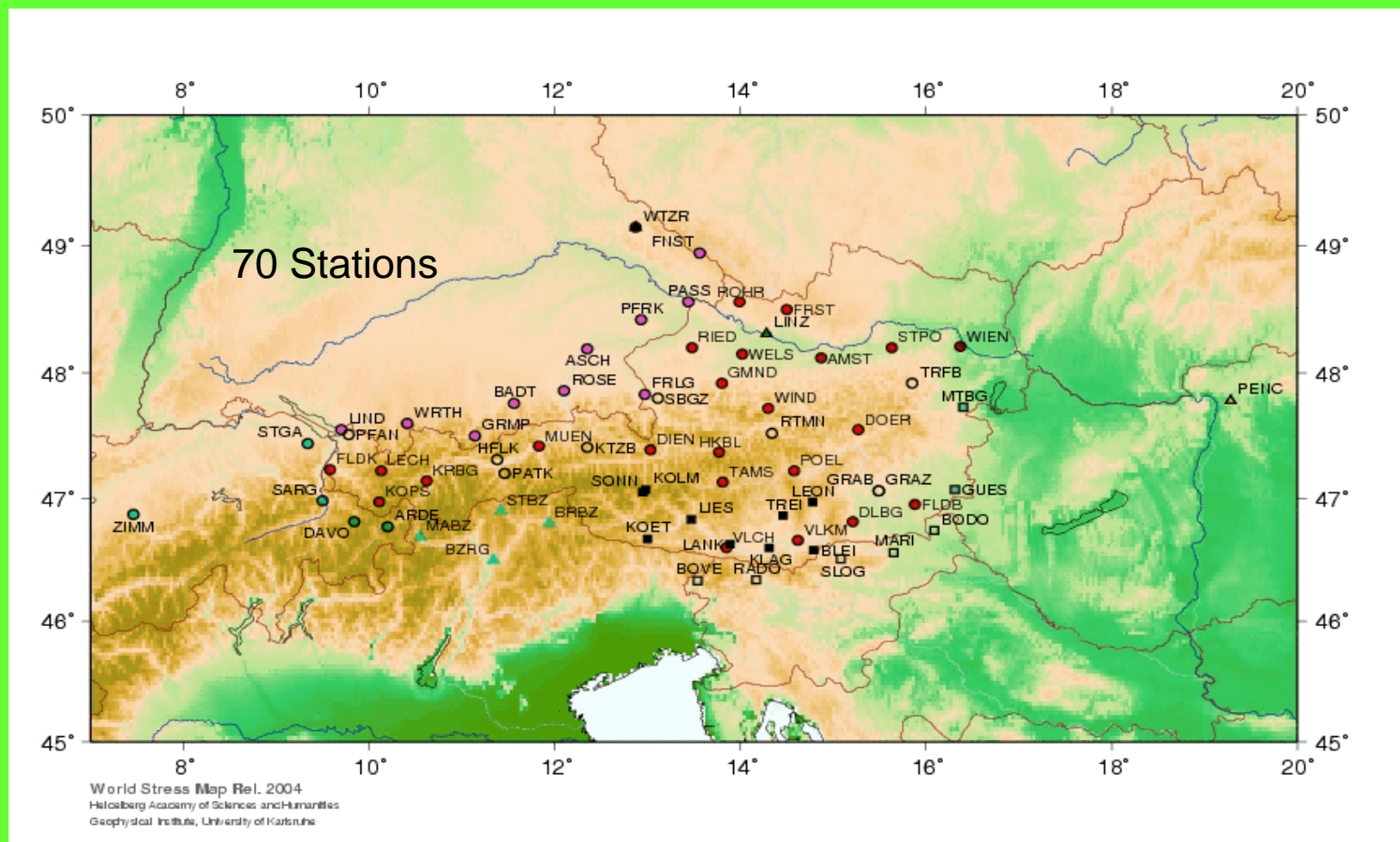
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AMON

Austrian Monitoring Network



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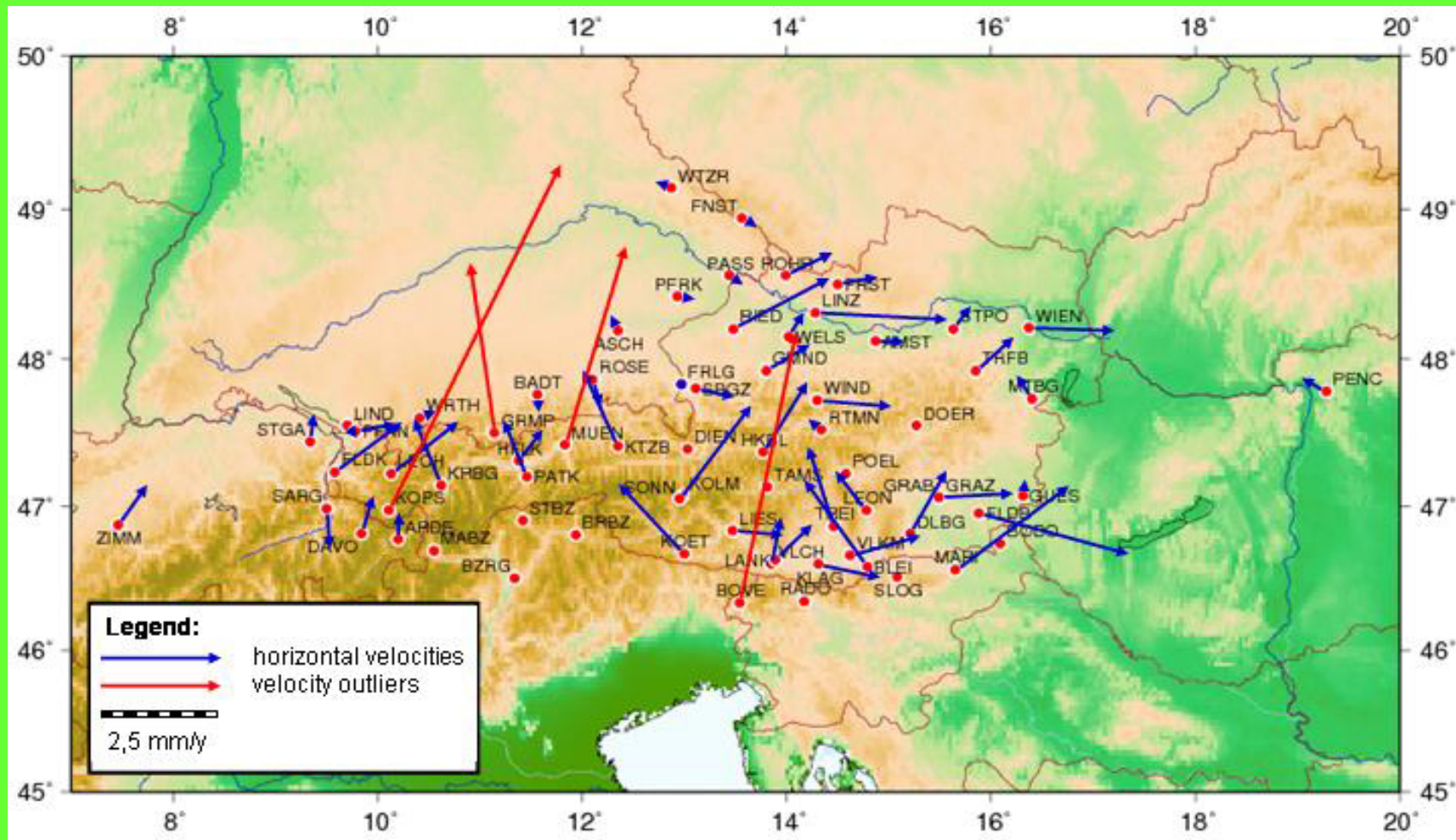
Processing



- **Weekly** results (EPN standards, Bernese Software 4.2) since 1999
- Reference **Minimum constraint** solution on GRAZ, HFLK, PENC, PFAN, STPO, WTZR, ZIMM with IGS/EPN coordinates and velocities
- **EPN offsets** for IGS/EPN stations applied
- Raw time series checked for **outliers** (isolated values lateral >10 mm, vertical >20 mm)
- Outliers removed → **cleaned time series**
- 70 Station velocities estimated (12 too young), sigma of unit weight **0.5-1.5 mm** horizontal, **2-4 mm** vertical, BSW formal sigmas **0.1 mm/year**
- **ITRF2000 rotation** of Eurasia removed
- Comparison to EPN values (7 common stations, mean difference 0.5 mm/y , worst GRAZ Up velocity with 2 mm/year)



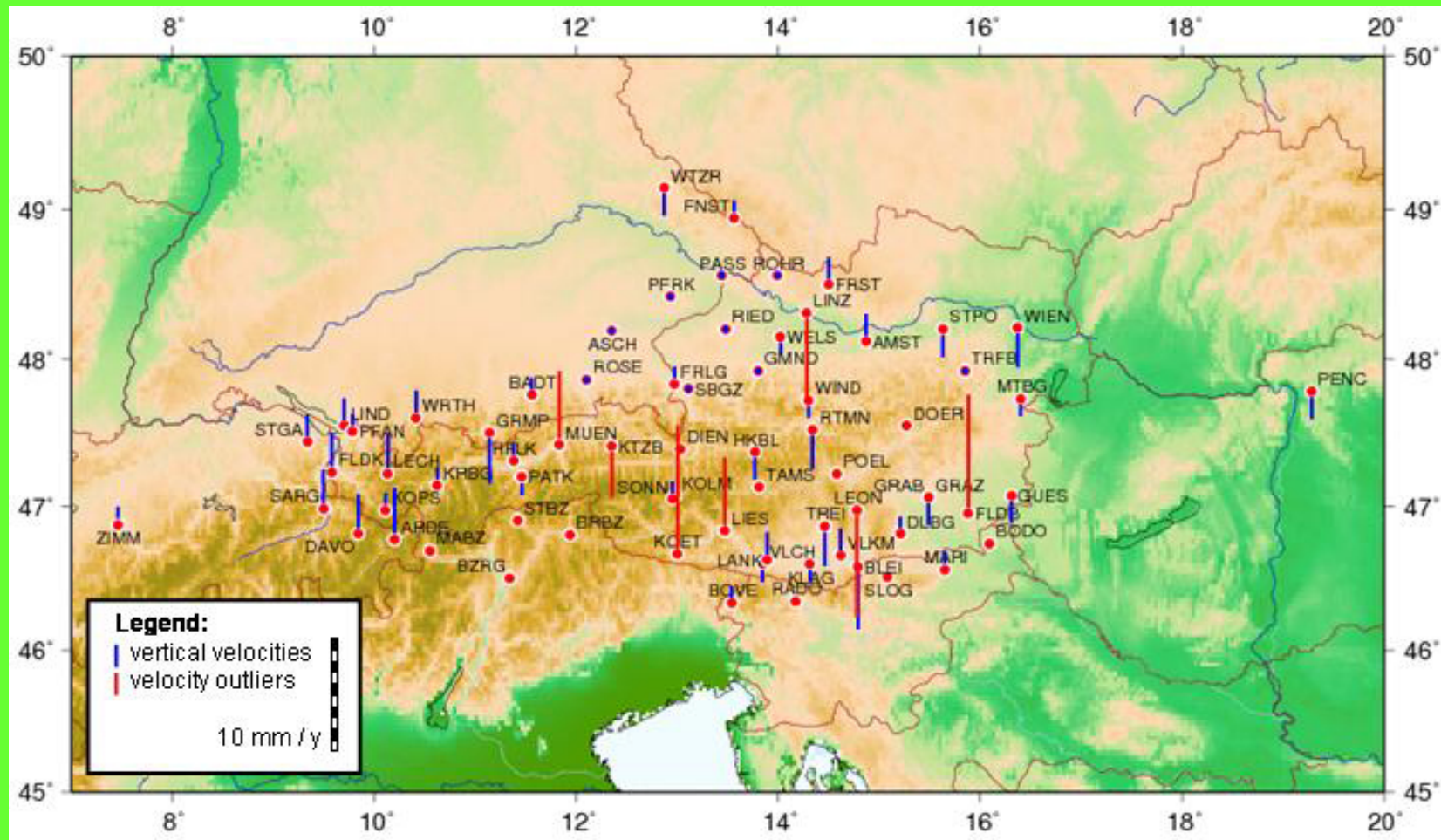
AMON Station Velocities Horizontal



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AMON Station Velocities Vertical



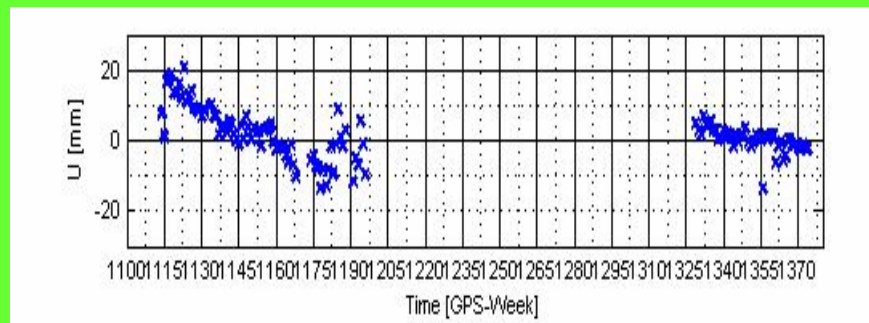
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Time Series With Problems (1)

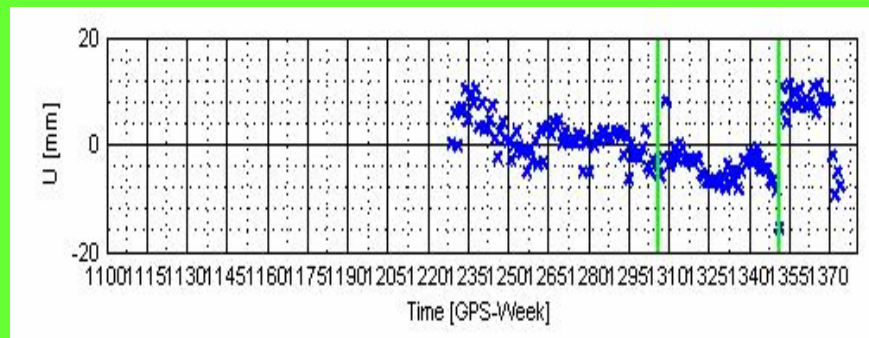


- Equipment changes, dome effects, unknown sources



LINZ

NEW DOME?



LEON

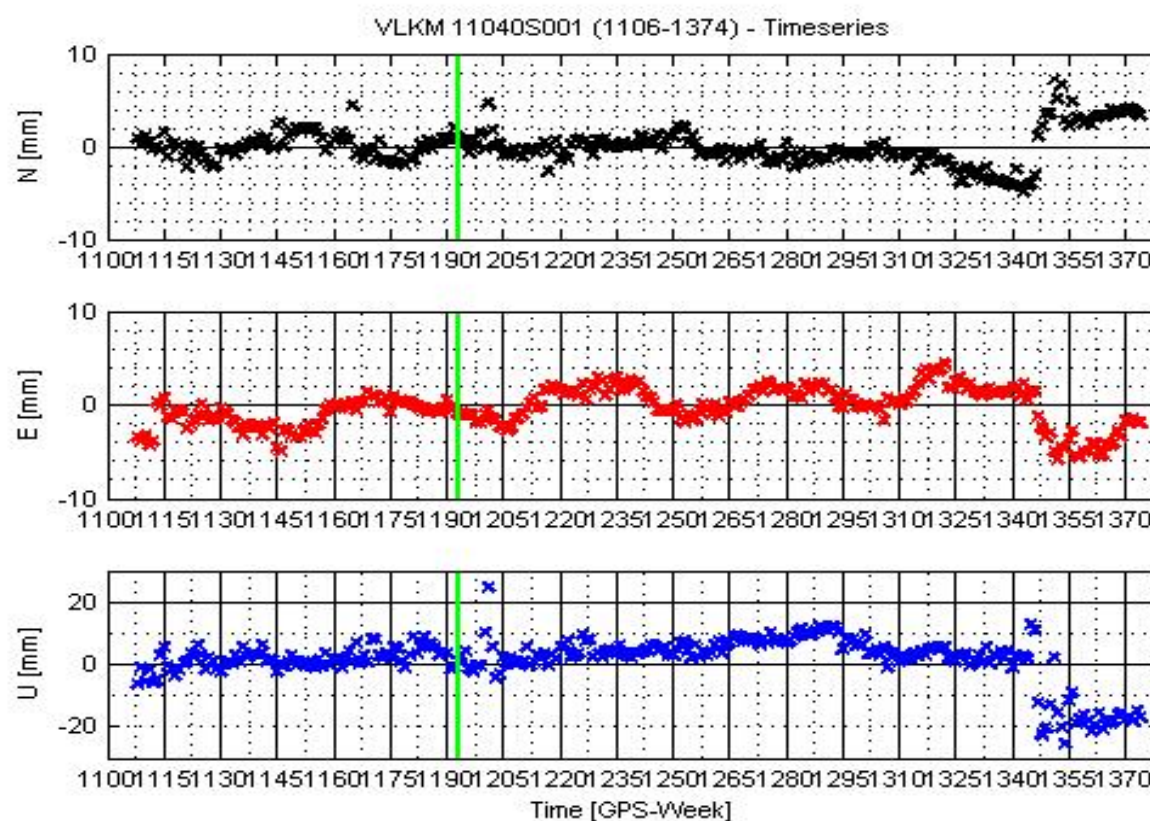
PHASE CORRECTION?



Time Series With Problems (2)



- External influences



VLKM

ROOF
REPAIR

ANTENNA

ATTACHMENT

MOVED?

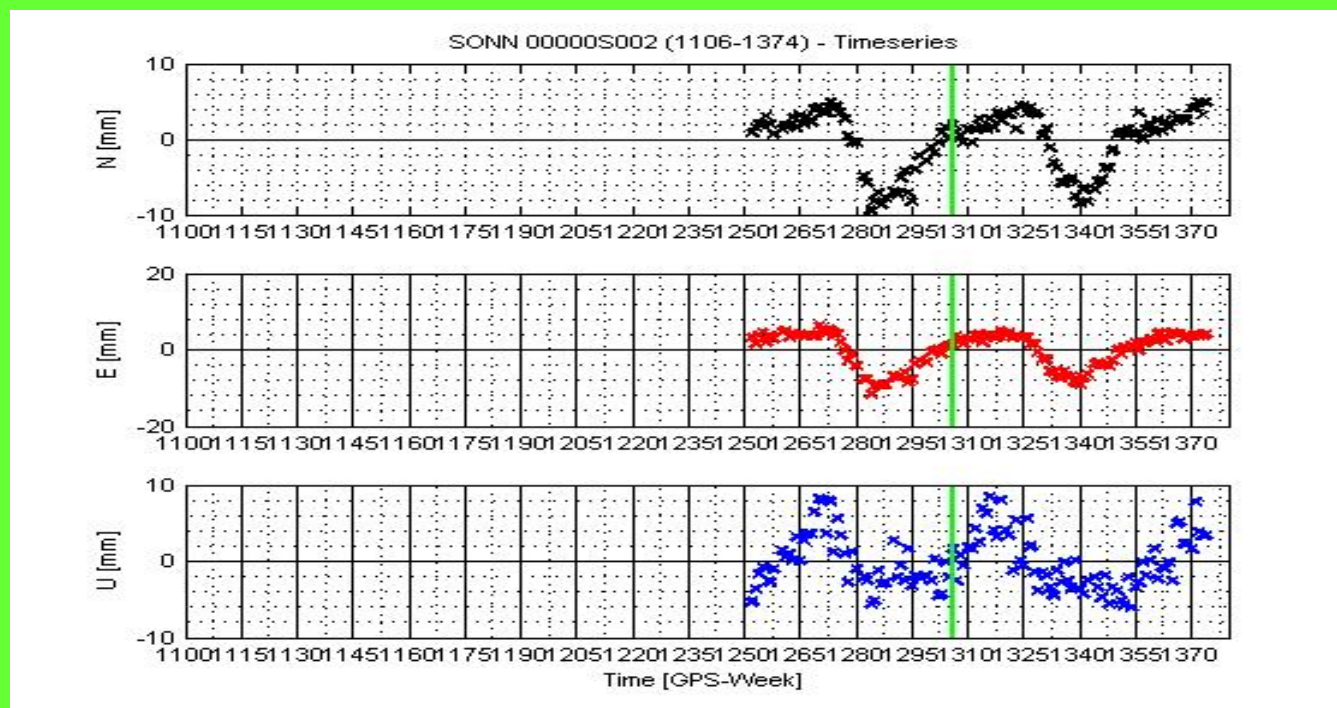


Time Series

Seasonal Effects (1)



- HFLK, KOET, MTBG, PATK, SARG, SONN, TRFB, WIEN, WIND lateral amplitudes >5 mm, vertical >10 mm
- Minor effects at velocities (sigma of unit weight higher)



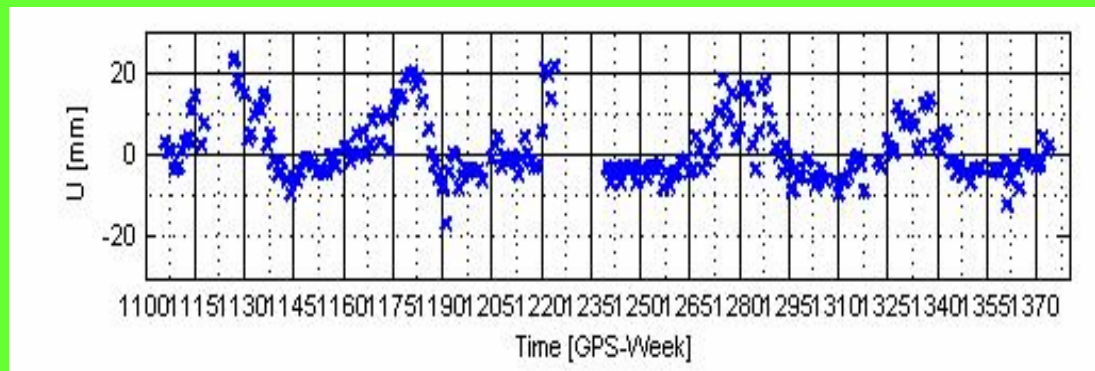
SONN 3200 m
SUMMER
MELTING



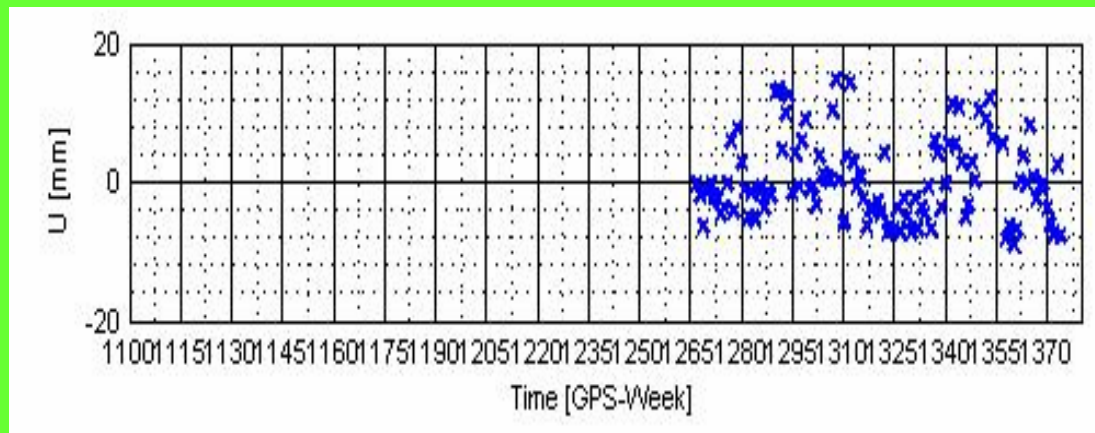
Time Series Seasonal Effects (2)



- Probably atmospheric effects



PATK 2300 m
SUMMER/FALL
HIGH



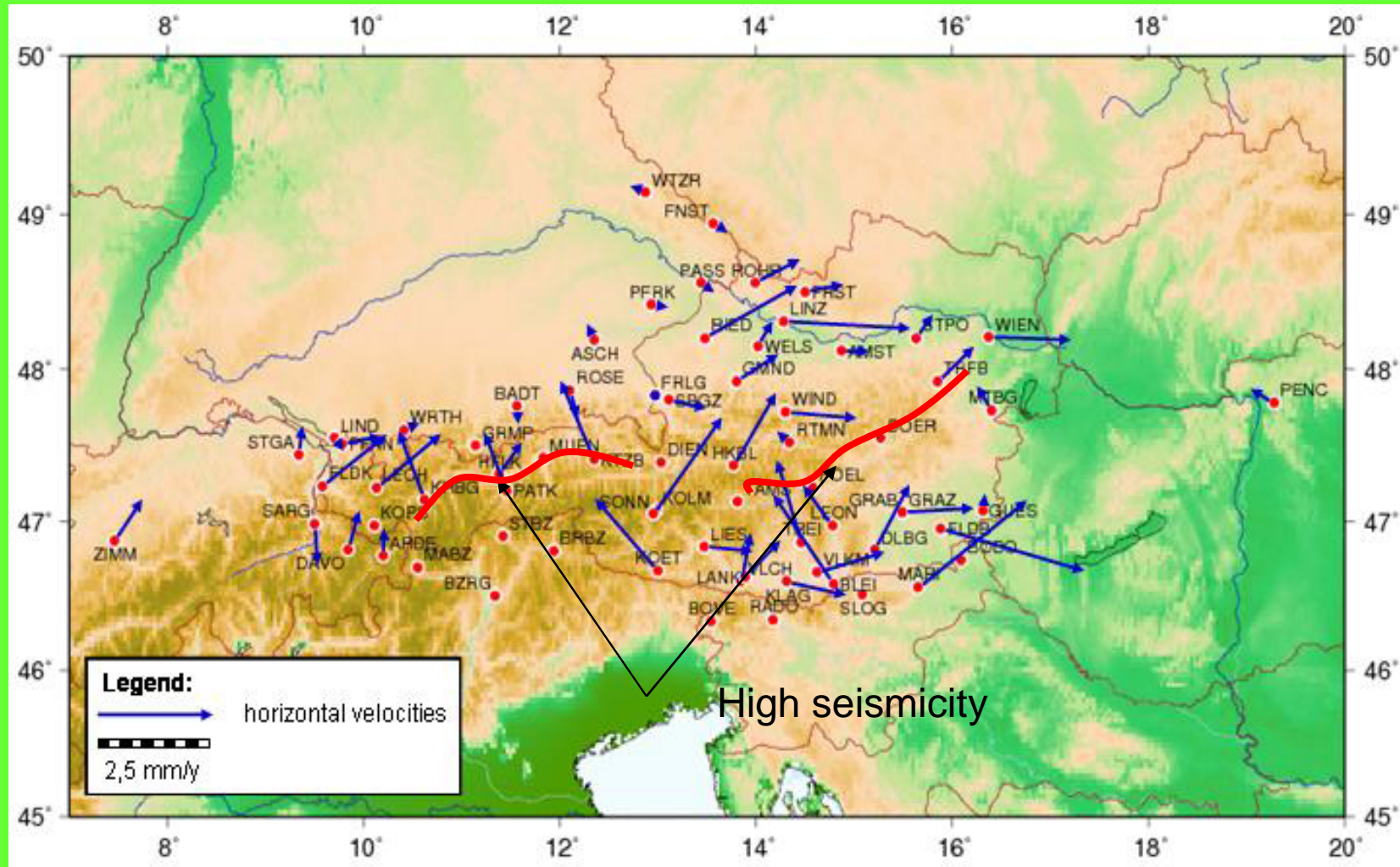
TRFB 1100 m
FALL/WINTER
HIGH



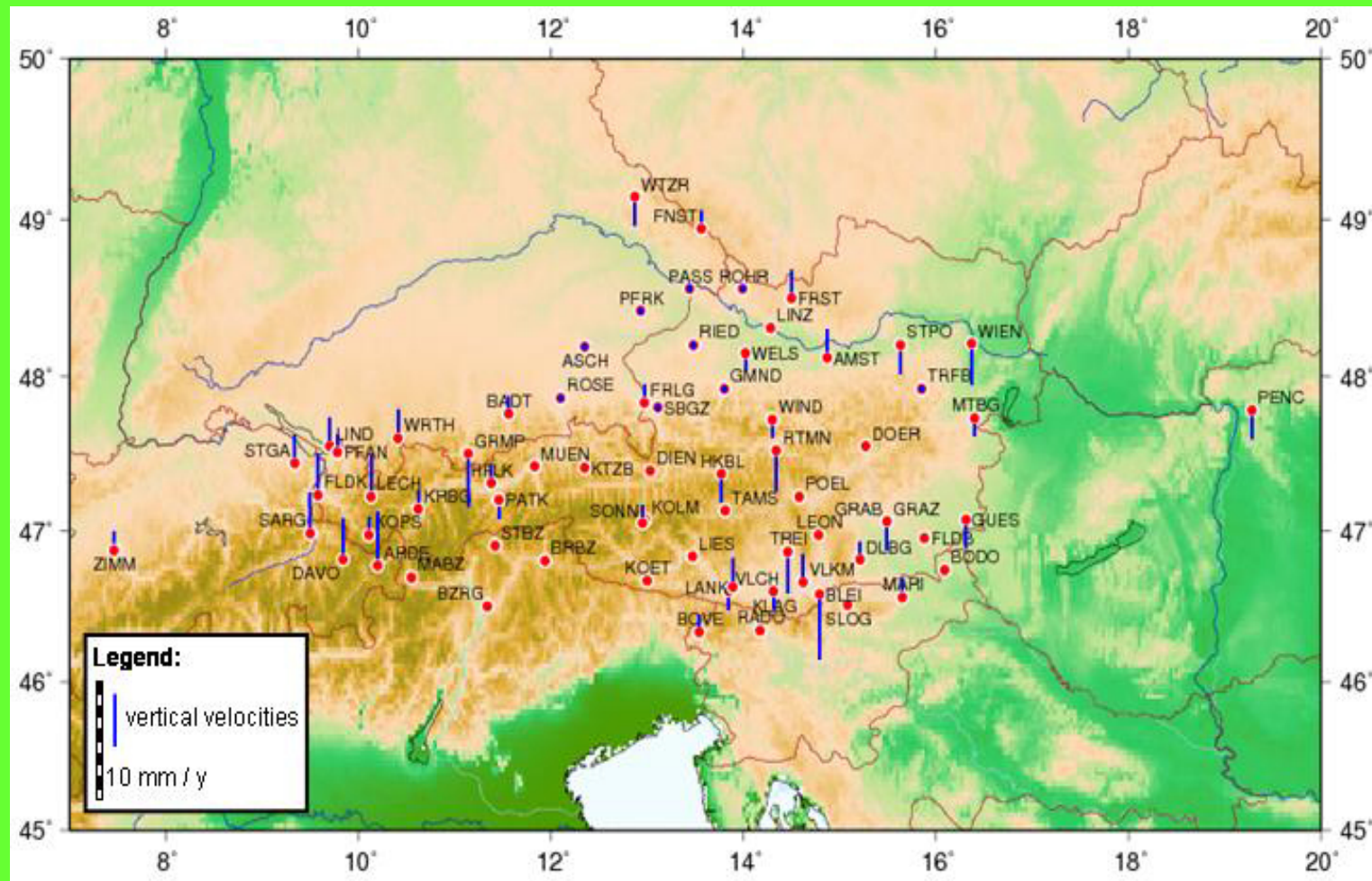
Strange Velocities



- BOVE, FLDB, GRMP, KOET, KOPS, KTZB, LEON, LIES, LINZ, MUEN
Difference of >3 mm/year to neighbours
- Equipment effects at GRMP, KOET, LEON, LIES, LINZ ?
- Local effect: KOPS new pillar moving, old pillar ok, probably KTZB too
- Unknown: BOVE, FLDB, MUEN



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Conclusion



- Time series are long and accurate enough to calculate station velocities in the Eastern Alps
- Coverage of main geological parts quite good
- Large part of stations shows big seasonal effects in coordinates
- Apart from local effects ETRS89 intraplate velocities in the Eastern Alps are very small and smooth
- Except the very stable Northern Forelands movement clusters cannot yet be interpreted



Thank You !