

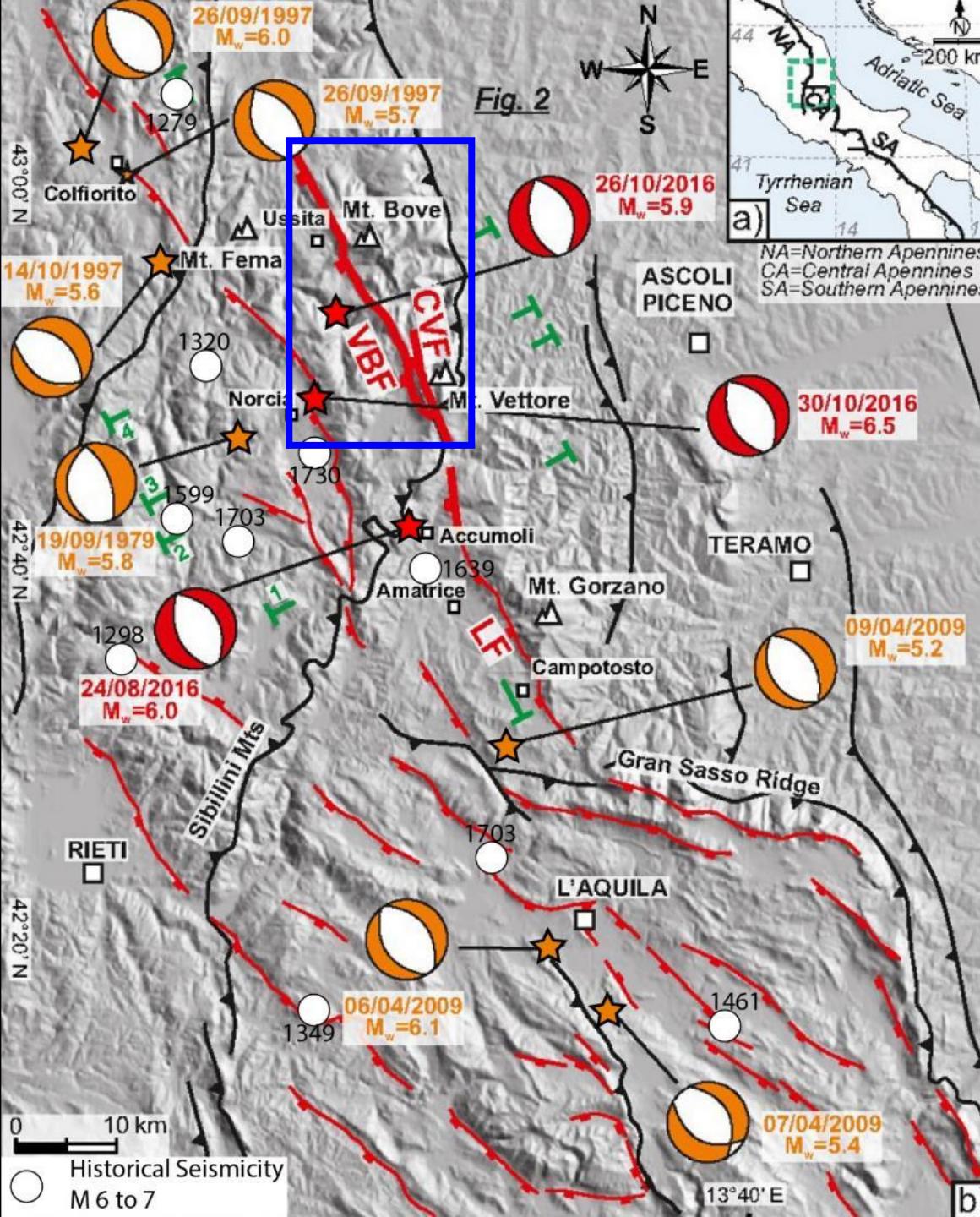


# Comparing coseismic slip with mid- and long-term displacement on the Mt. Vettore- Mt. Bove faults system after the 2016 central Italy earthquakes:

Insights into growth and segmentation processes  
of an active extensional system

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# HOW DOES A FAULT SYSTEM EVOLVE IN TIME AND SPACE ?



# DISPLACEMENT ASSOCIATED WITH THE MVB FAULT SYSTEM ACTIVITY THROUGH TIME

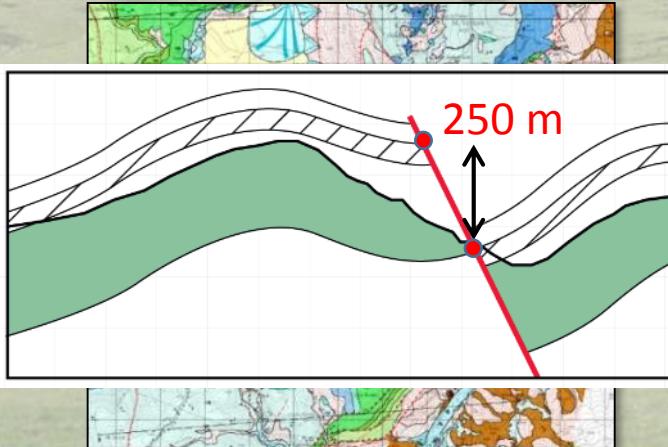
PLEISTOCENE

Early

~1 Myr  
LONG TERM

Geological vertical displacement's measurement of the MVBFS

- Geological maps
- **Field survey in key areas**
  - Reference bedrock formation (Marne a Fucoidi) – thickness accuracy 30 m



Middle

Late

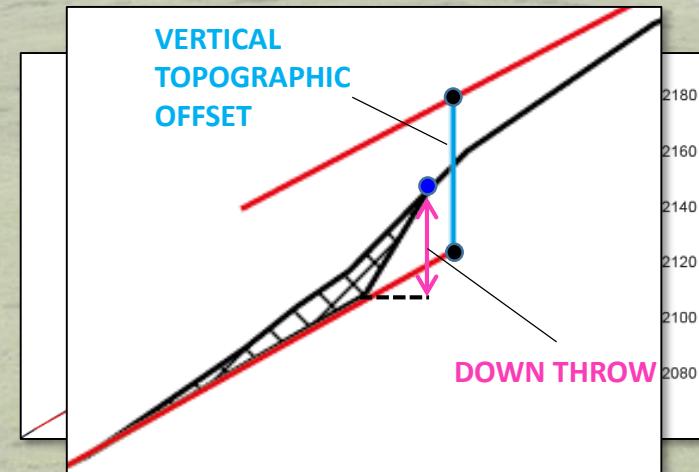
~22600 yr

MIDDLE TERM

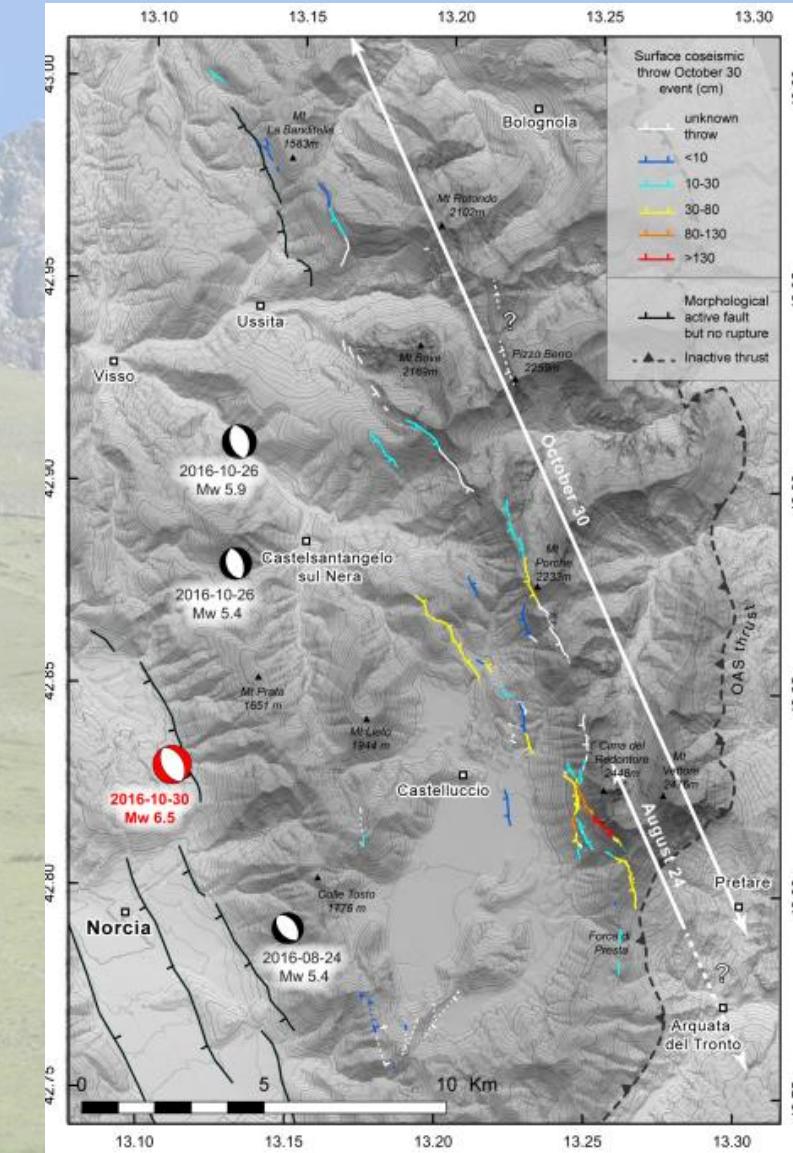
*Post Last Glacial Maximum*

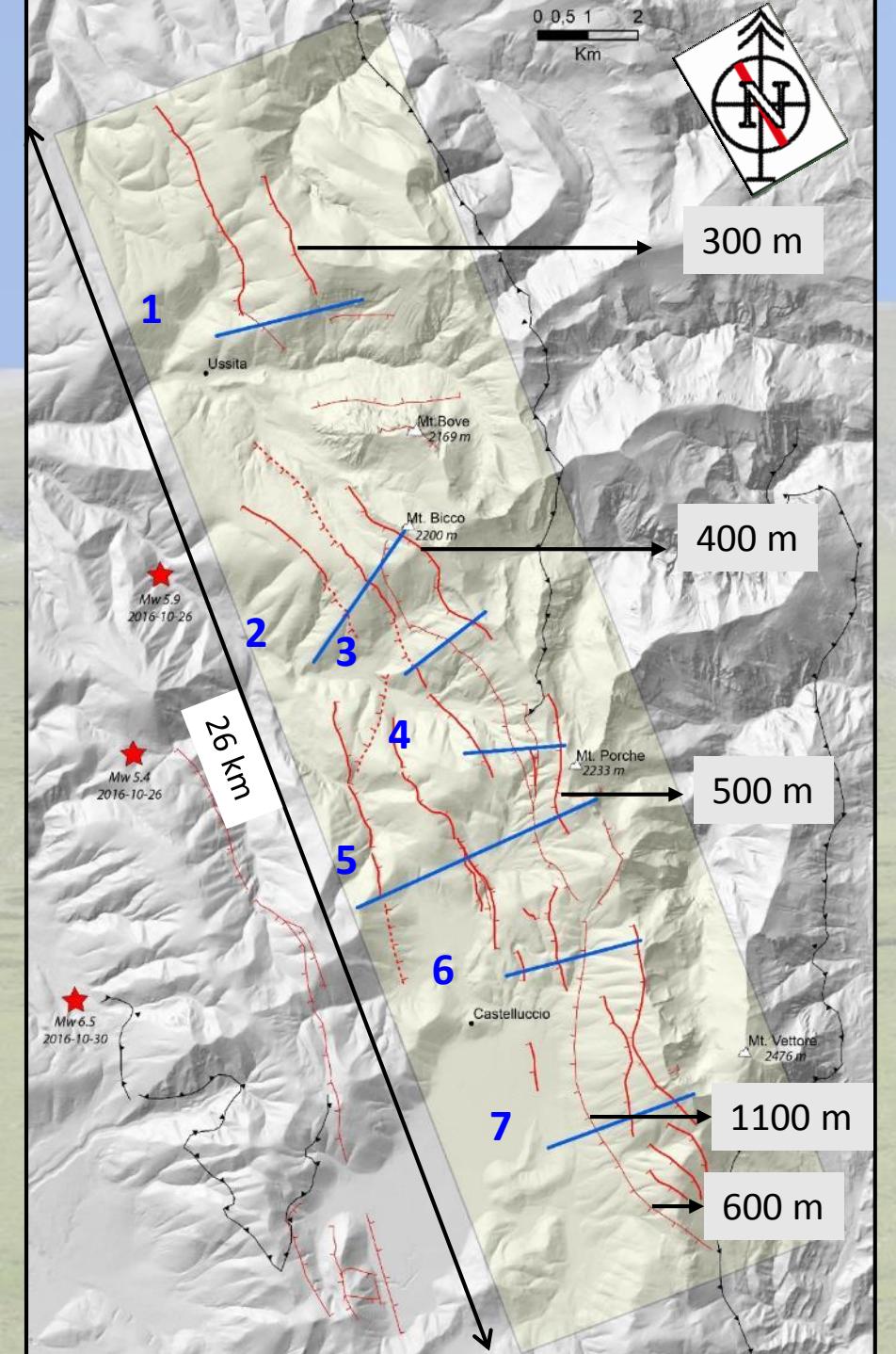
Morphological cumulative offset= the fault scarp

- High resolution topographic profiles
  - DEM 2 m (Pleiades)
  - DEM 10 m

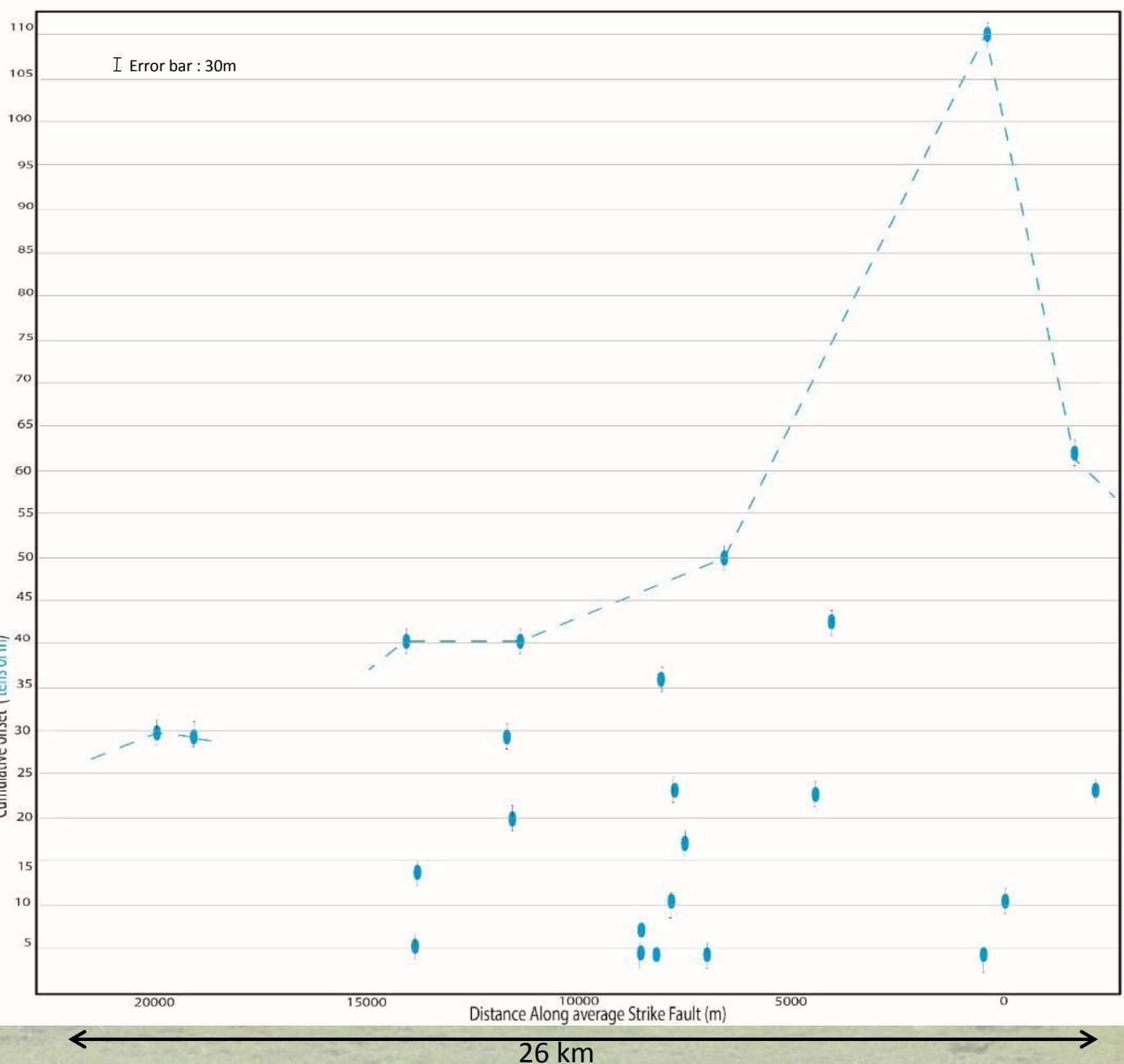


HOLOCENE



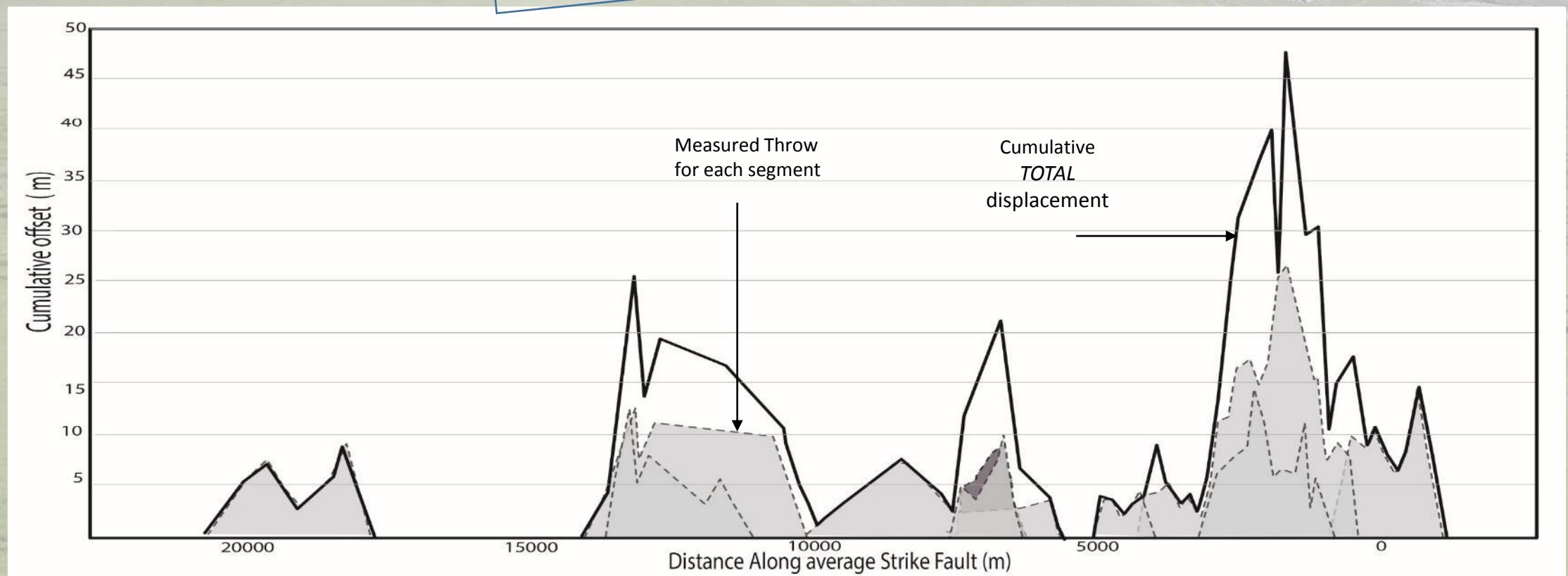
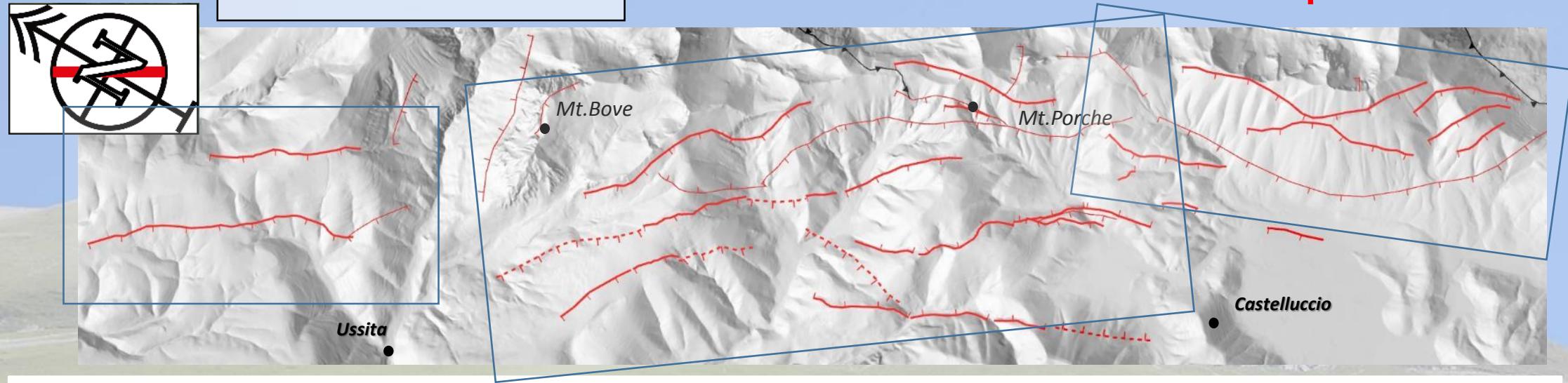


# LONG TERM Geological cross sections



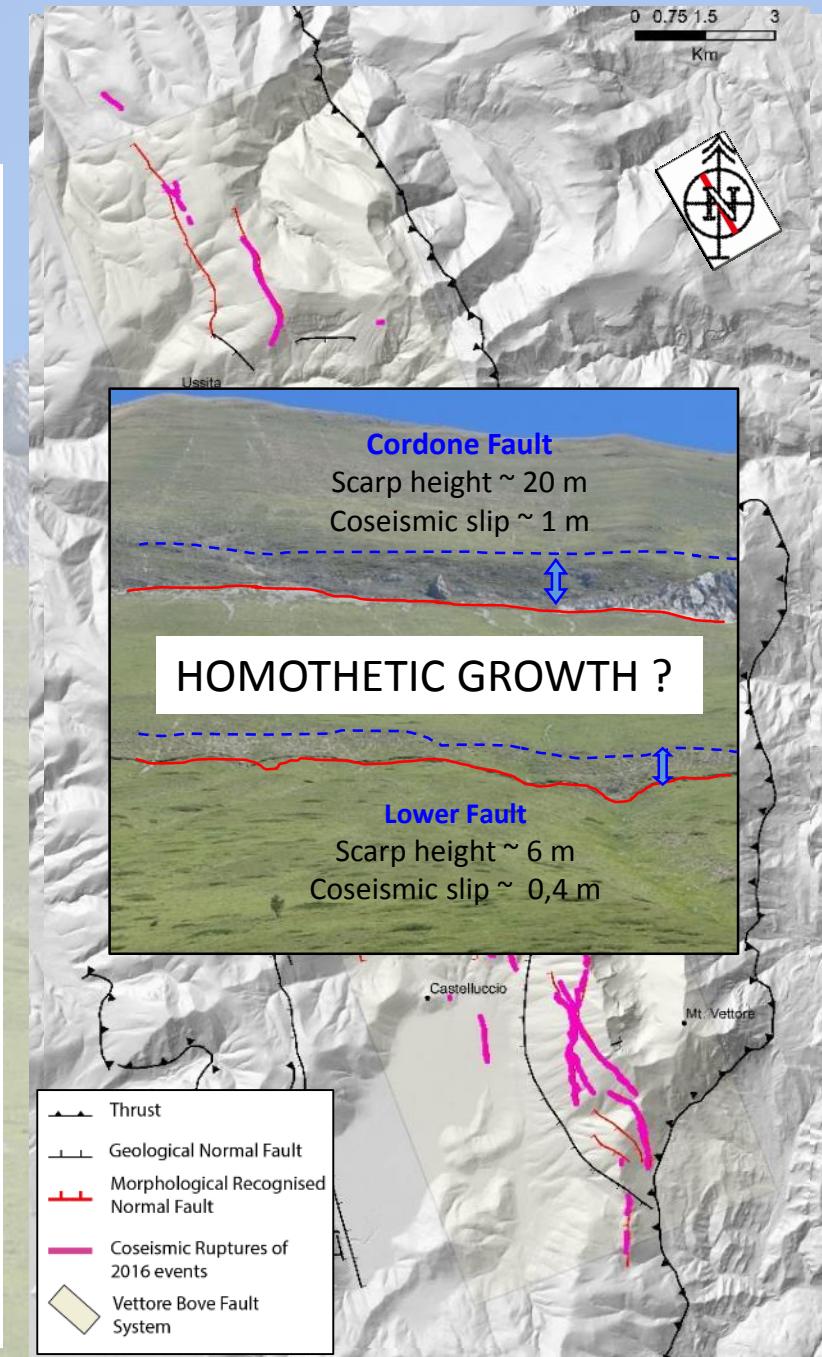
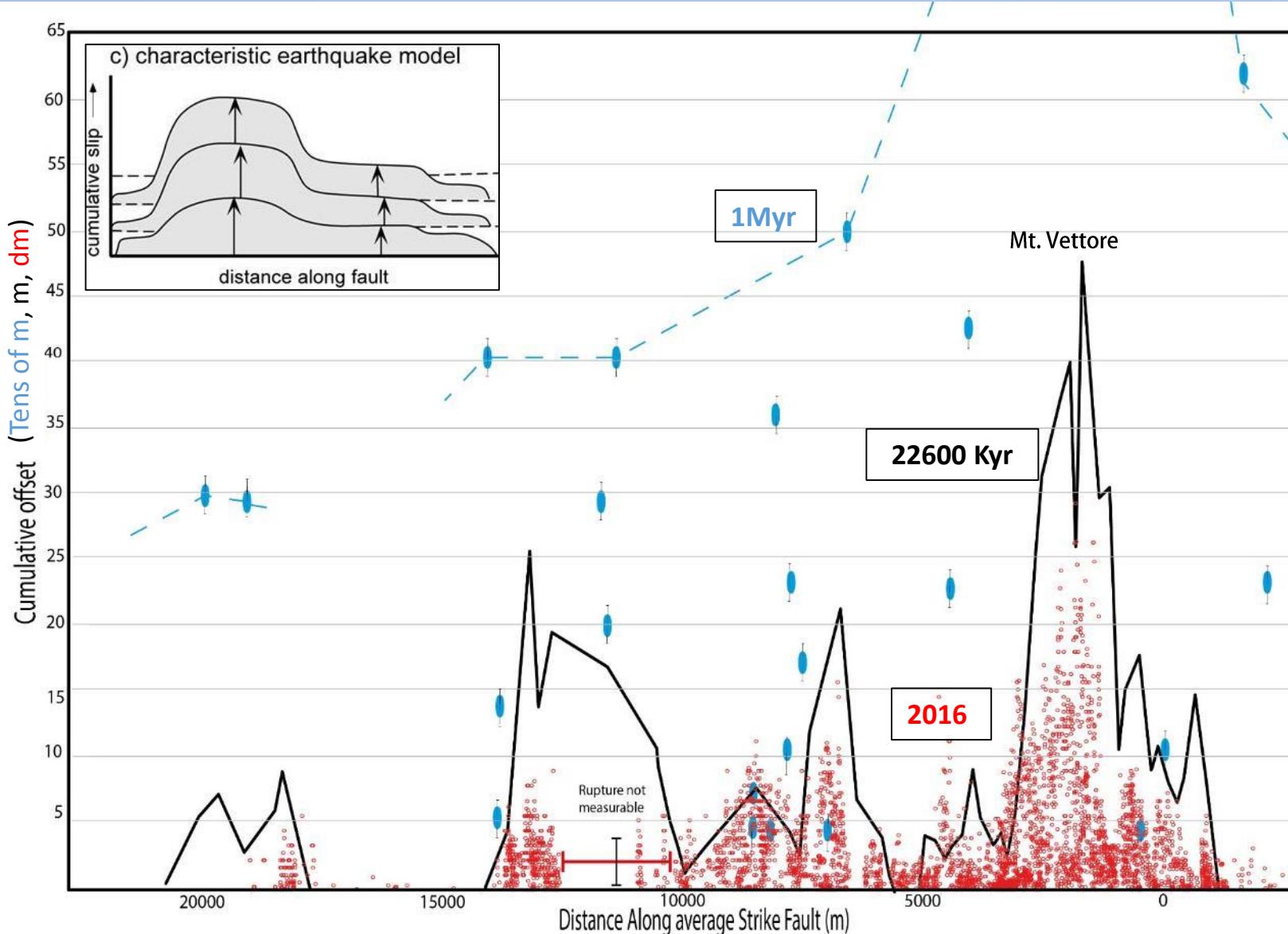
## MIDDLE TERM

# Post Last Glacial Cumulative Displacements

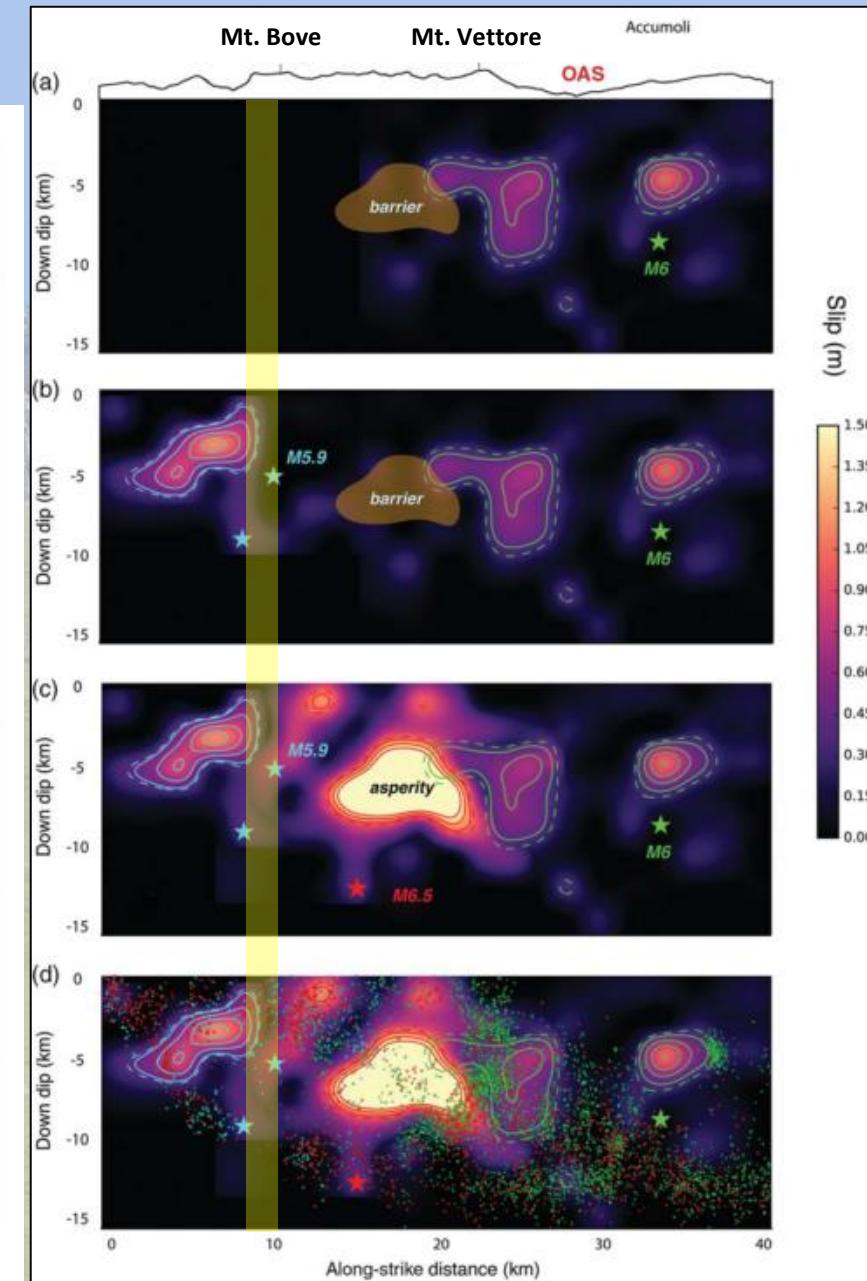
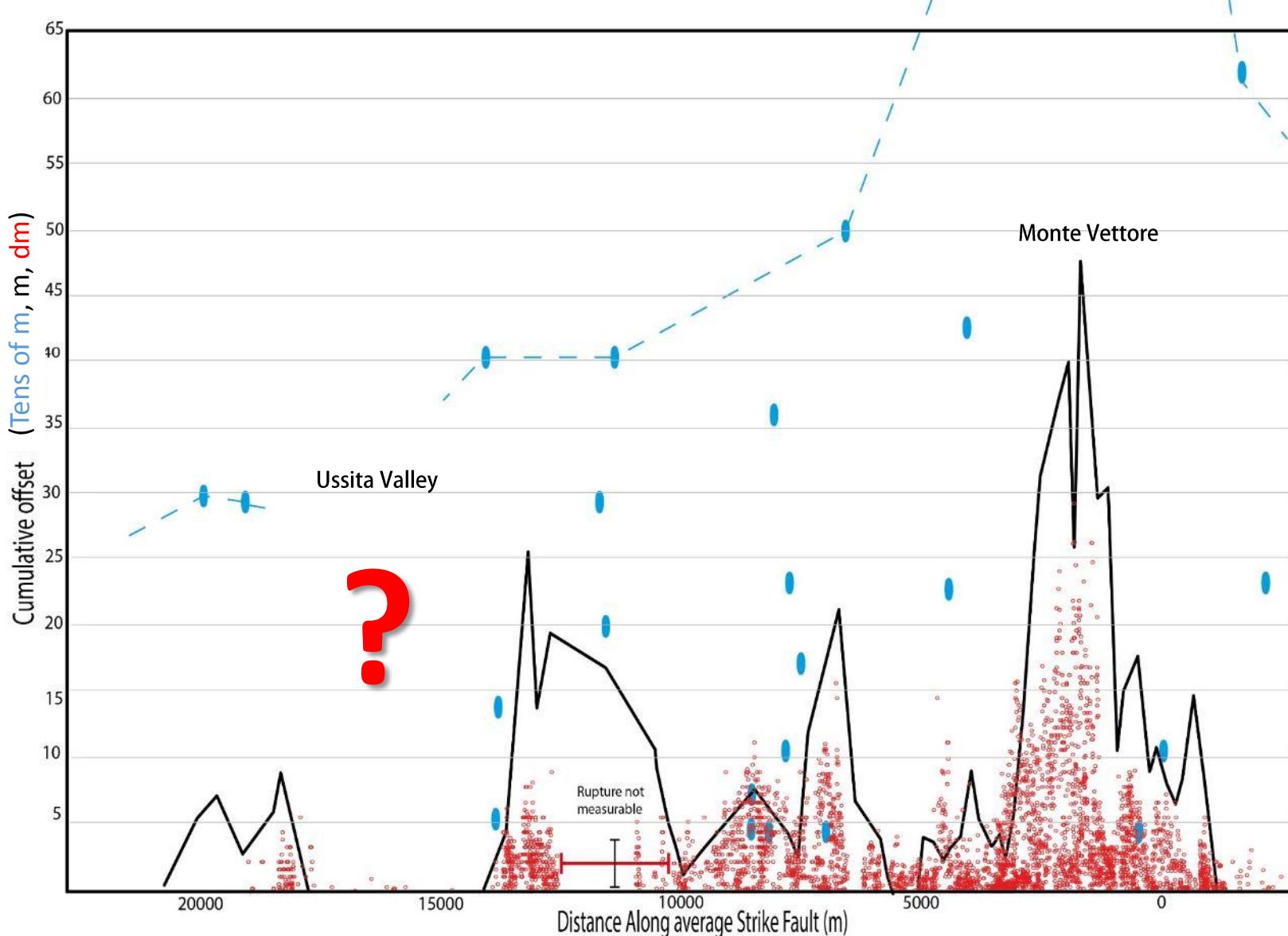


# LONG TERM vs MIDDLE TERM

# vs SHORT TERM

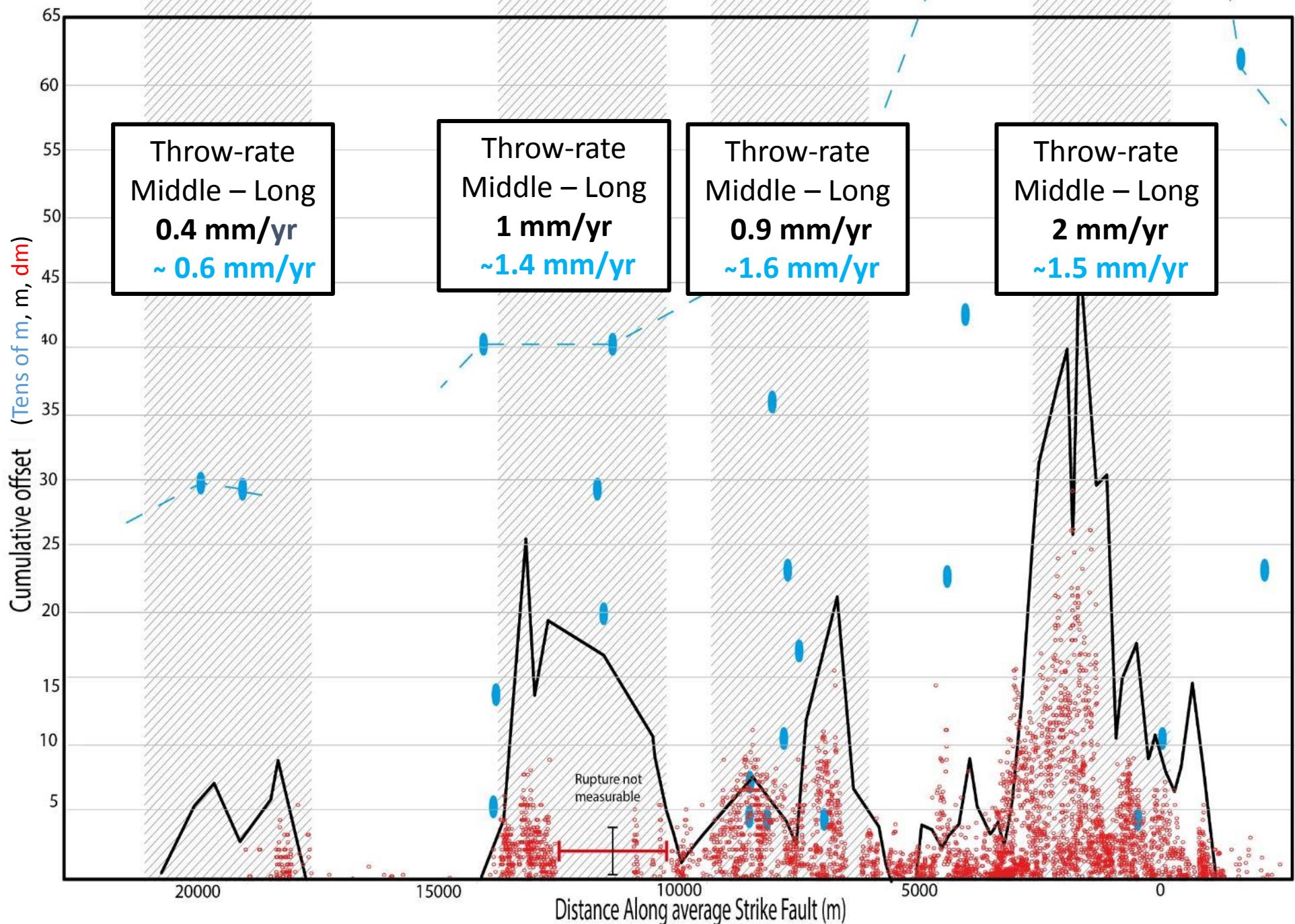


# WHY THIS GAP?



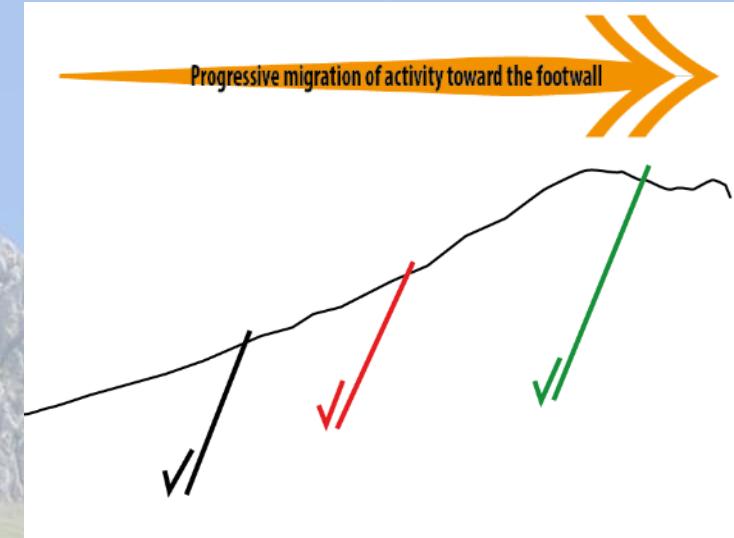
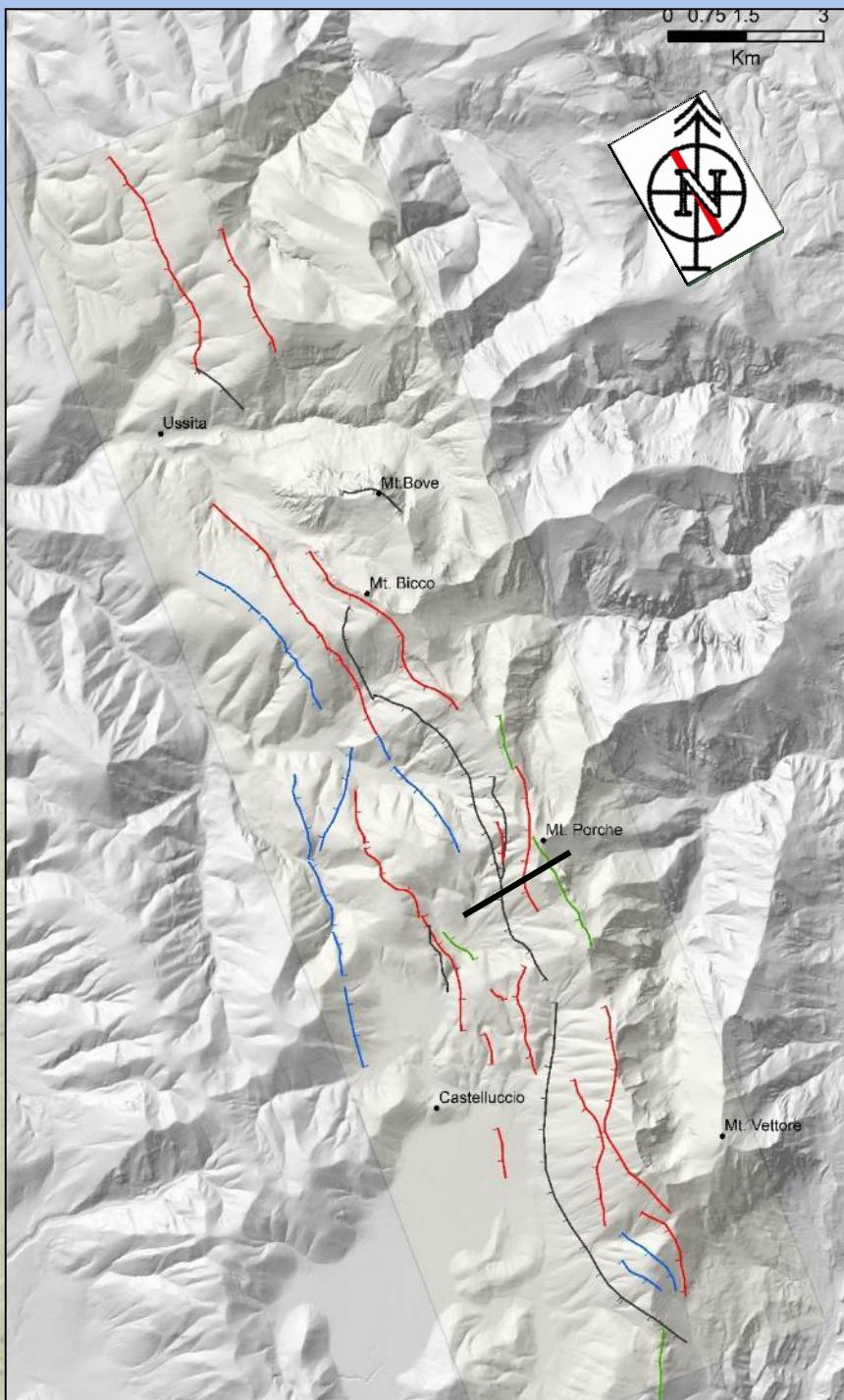
## TIME EVOLUTION : SLIP VELOCITY

- Characteristic earthquake behaviour
- Maximum throw-rate of each sector



## SPATIAL EVOLUTION

- Activity at all time scales
- Mid term activity
- Long term activity
- Short term activity



**YOUNGER  
EASTWARD and  
UPWARD**

## CONCLUSIONS

Based on geological, morphological and field observations we provide quantitative information on the evolution of an active normal fault system in time and space.

The pattern of displacement observed over the short and middle time scale is similar suggesting a characteristic rupture over the last 20 Kyr.

The displacement observed at all time scales is asymmetric with a progressive decrease northward and an abrupt decrease south of Mt. Vettore. The maximum displacement is observed on the Mt Vettore at all time scales.

In the Ussita area, there are no displacements at all time scales suggesting the presence of a «structural barrier».

The most recent faults are affecting the footwall block of the oldest geological faults.