This study was carried out in the framework of a project sponsored by the Hungarian National Science Foundation (OTKA NK83400) and TÁMOP-4.2.2/B-10/1-2010-0030

# Pleistocene alteration of drainage network and diverse surface morphology forced by basement structure in the foreland of the Eastern Alps

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Study area





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# Study area: geology





Outcropped uplifting metamorphic units on surface

Miocene sediment,

Different aged Pleistocene gravel terraces

24<sup>th</sup> April 2012

3/20

### **Study area: Miocene dynamics**

х

Hanging wall and sediment remnants on top of the Penninic window

Uplift



Exhumation of Rechnitz Window (Dunkl et al. 1998)

Х

Recent

WSW

Schöckl

Middle Miocene

Vertical movement

since Middle Miocene:

50 km

Post-rift sediments

Early-Middle Miocene

Syn-rift sediments

normal faults

(sample sites)

Subsidence

Austroalpine Paleozoic

Austroalpine basement

Penninic

### **Study area: recent dynamics**



Generalised stress and strain pattern by Bada et al. 2007

# Study area: surface morphology





### Hilly character since Upper Pannonian

E: - steep scarps

- slightly tilted blocks
- W: steep scarps
  - highly eroded area

# Study area: drainage network





# Study area: general surface structure



Slightly tilted block character? otherwise remnant ridges?

- Straights can be fitted to ridges
- Incised streams
- Steep scarps





#### 24th April 2012

#### **EGU General Assembly 2012**

# Study area: general surface structure





### Study area: general surface structure model

- Slightly tilted units bordered by steep scarps

- subsiding/uplifting units

contradictory theories:

- tectonic origin
- formed by former rivers





- Slightly tilted units bordered by steep scarps
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contradictory theories:

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1.evidences to tectonic forces - terrace levels

- lignite layers

# 2.connection to the deeper structure

- faults
- tilted paleosurfaces





# Lignite layers

+ field observations
fault series
+ abandoned mine:
0.5-6 m throw
1-5 m folds

### Smaller then the scarp

2

Distance (km)

3

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Elevation a. s

100-

50

### **Gravel terraces, theory**



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# Systematic changing Tilting or incision?



Further details of drainage reorganization are provided on EGU2012-403, today at board A443

### **Gravel terraces**











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### **Connection to the basement**



# Conclusion

# Results proved:

- continuous tilting
- normal faulting
- connection to the deeper structure
- BUT: eroded scarps

# Further issues:

- tectonics/compaction/erosion?





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Kőszegi Mts

Vas Hill

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# Thank you for your attention!

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and Swell

2 3

1 km

0 km -1 km

-2 km

-3 km

-4 km

10 km

3000