

# **Roughness description and characterisation of major fractures in three different chalks of the North-West European Basin**

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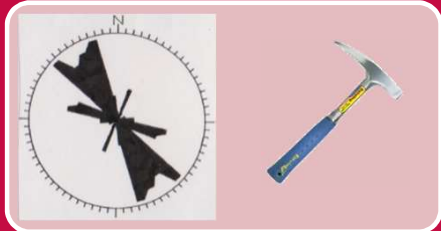
# So many questions about Chalk

What can be seen at different **scale** of work?

Can **lab-generated** fractures be compared to **natural** fractures?

How can we qualify fracture plane **roughness**?

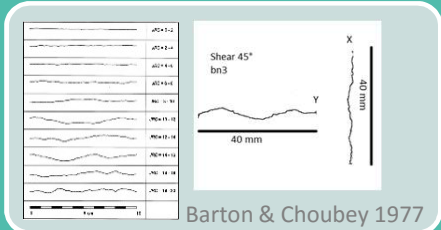
# Process & Tools: MACRO to MICRO



## OBSERVATION ON SITE

Faults & Joints

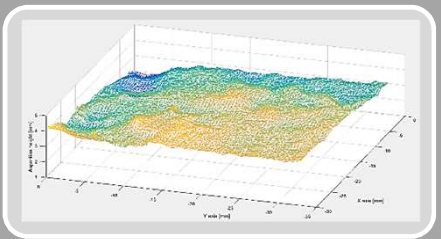
Geological and tectonic background



## LAB VISUAL CLASSIFICATION

Unevenness and waviness

JRC



## LASER SCANS

Statistical parameters

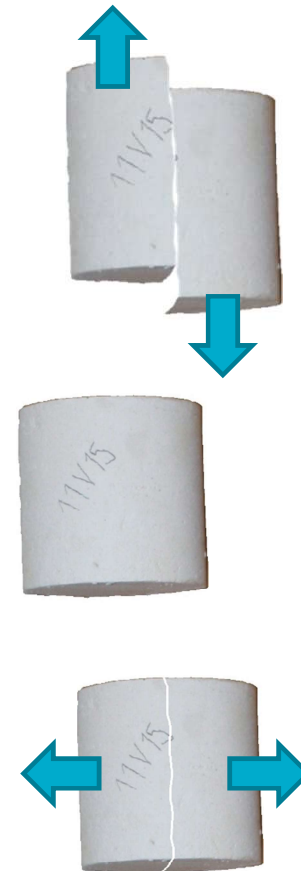
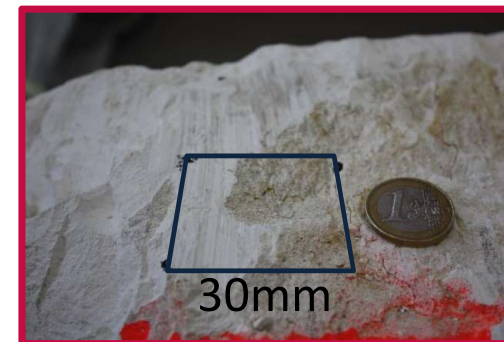
Fractal parameters

> metric

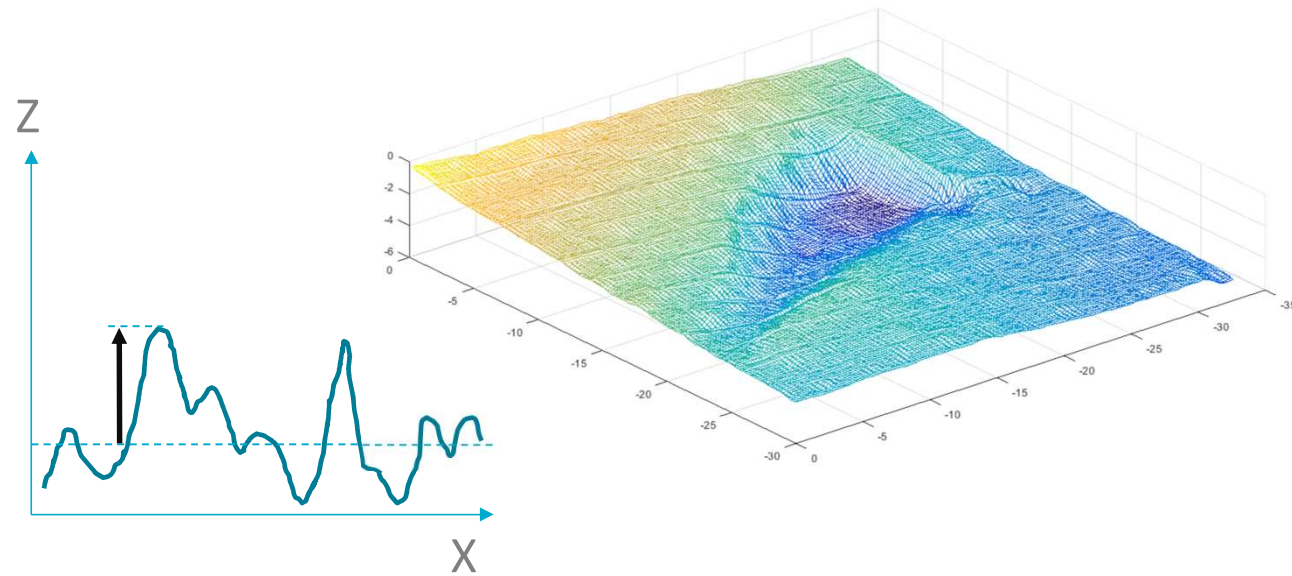
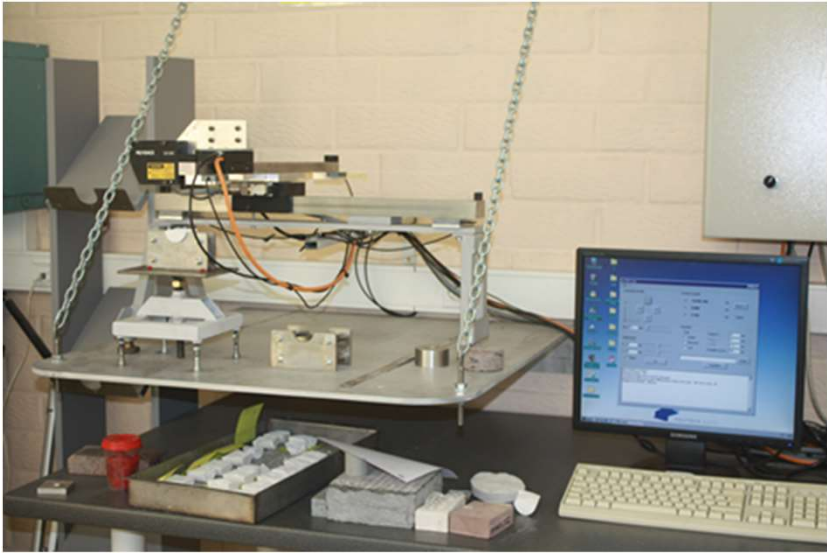
scale

sub-mm

# Natural and lab-generated fractures



# Roughness characterisation



About 250 scans with:

**Ra:** asperities height average

**Zz:** RMS average

**Dvar:** semi-variogram fractal dimension

**Dyard:** yardstick rule (divider) fractal dimension



# Rock strength and sample fracturing

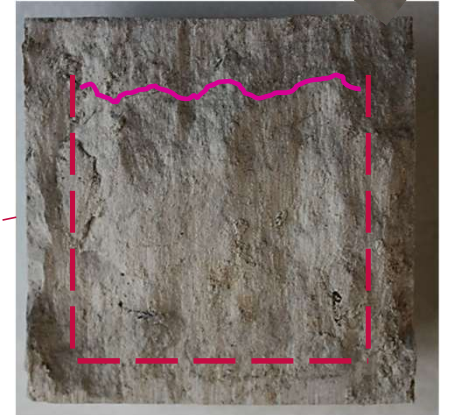
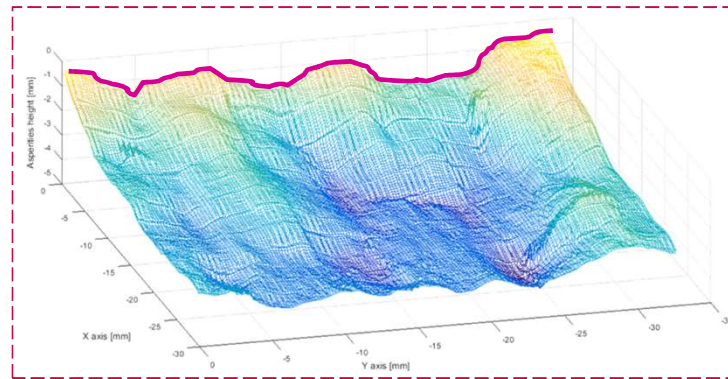


Location	Age	Av. UCS [MPa]	Std dev. [MPa]	Porosity [%]	Density [g/cm <sup>3</sup> ]
Mons, BE	Campanian	5.5	0.7	43	1.6
Arras, FR	Coniacian	6.7	1.0	43	1.6
Blanc-Nez, FR	L. Cenomanian	19.1	4.2	23	2.2

# Fault striation



40mm





# Twist hackles and ridges

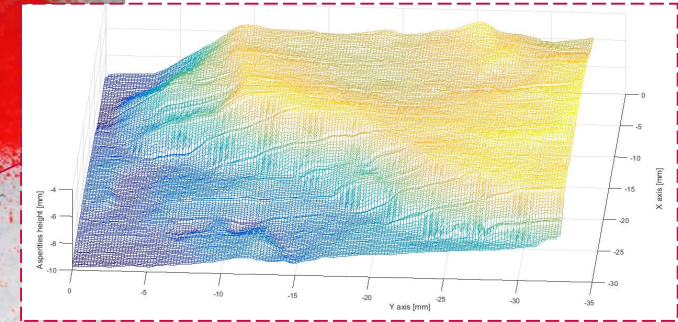
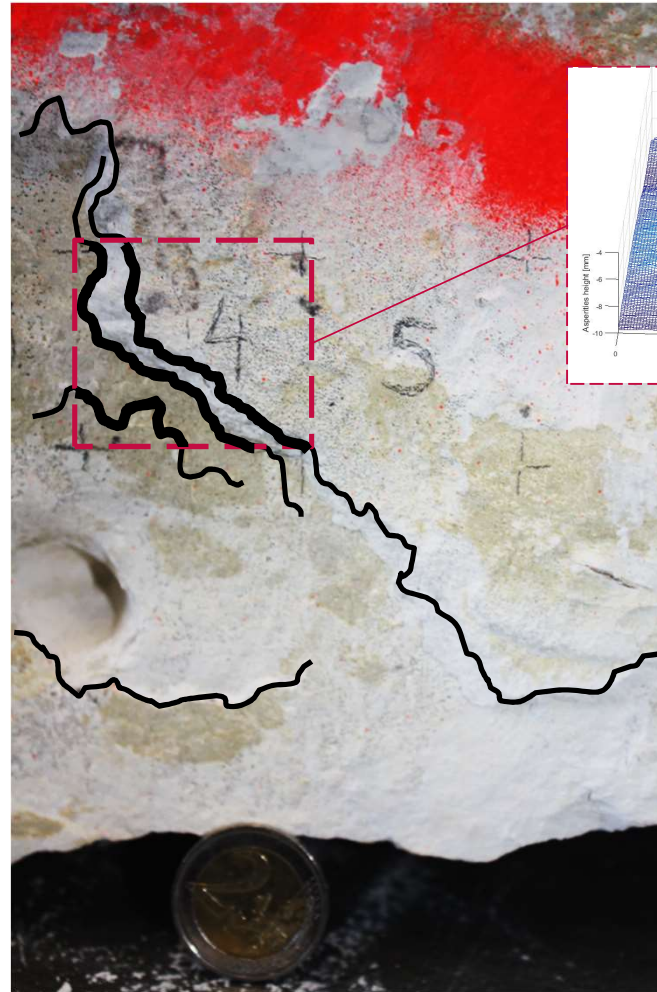
40mm





# Twist hackles and ridges

40mm

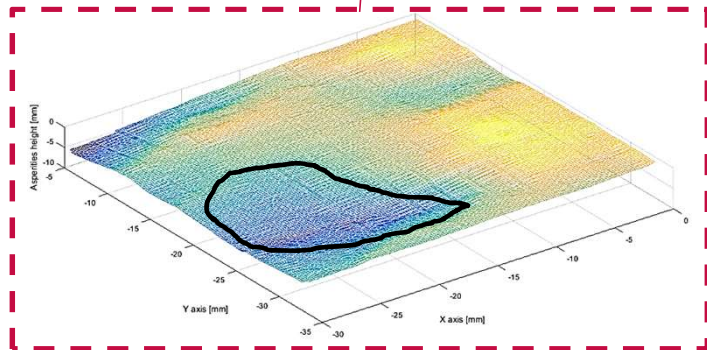
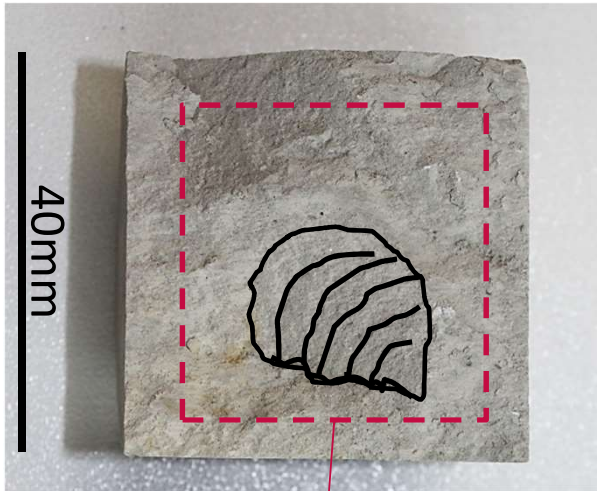


# Plumose



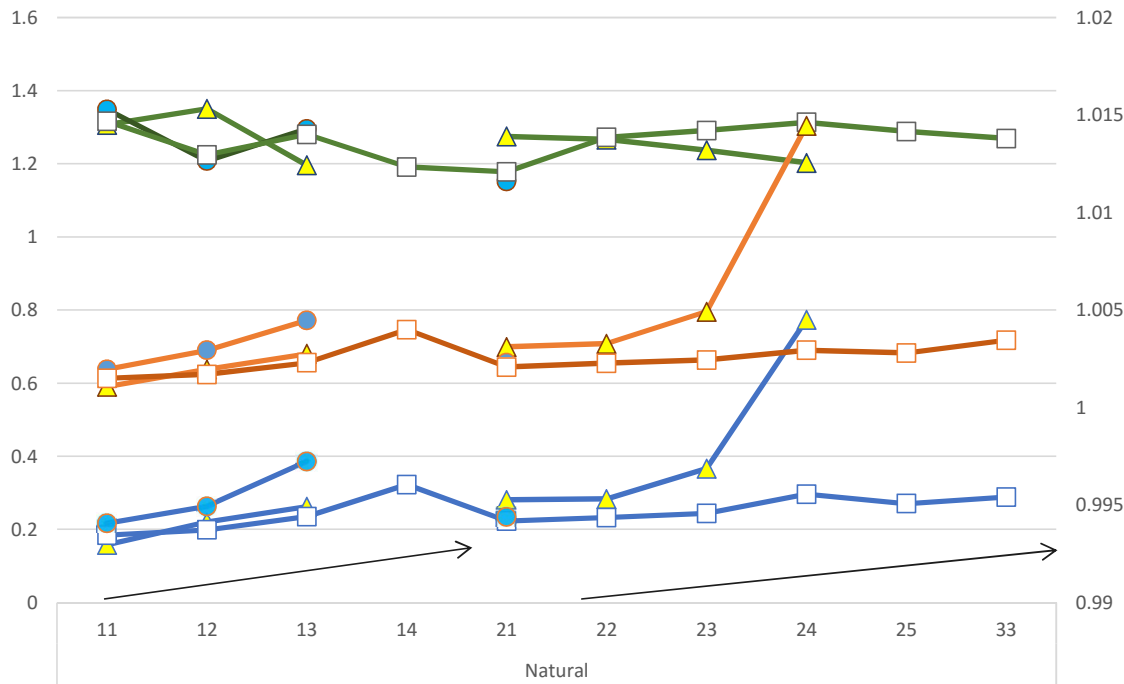


# Plumose



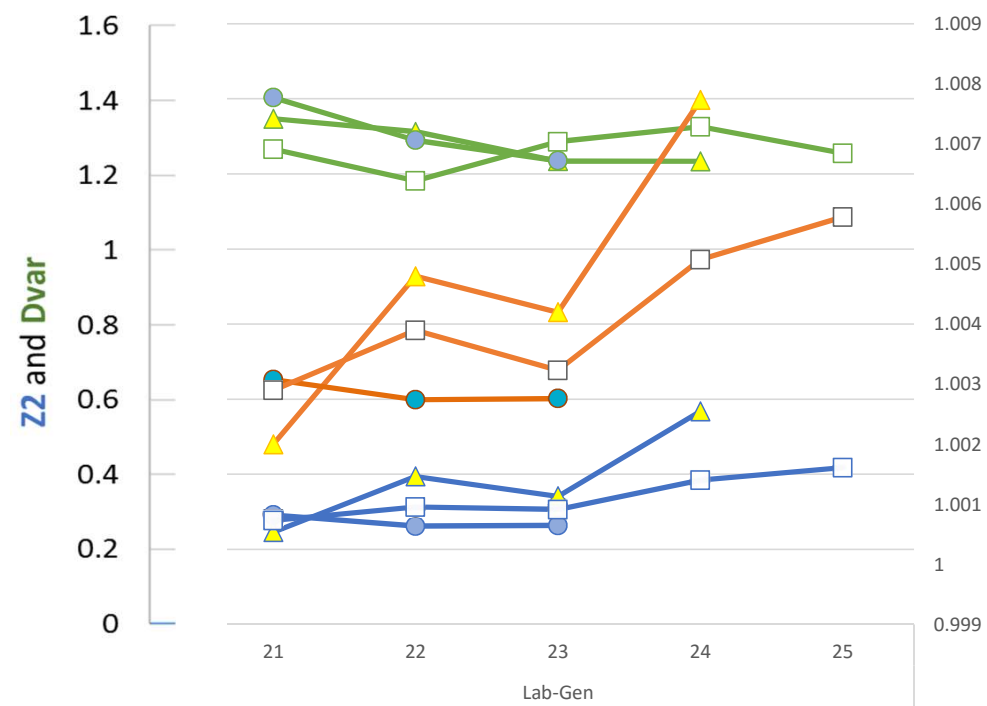
# ROUGHNESS RESULTS

## Natural



Increasing roughness based on visual observation

## Lab



Increasing roughness based on visual observation



# CONCLUSIONS

Natural vs. lab  
Scale of work  
Roughness



*it works!*

ARRAS

MONS

BLANC-NEZ

