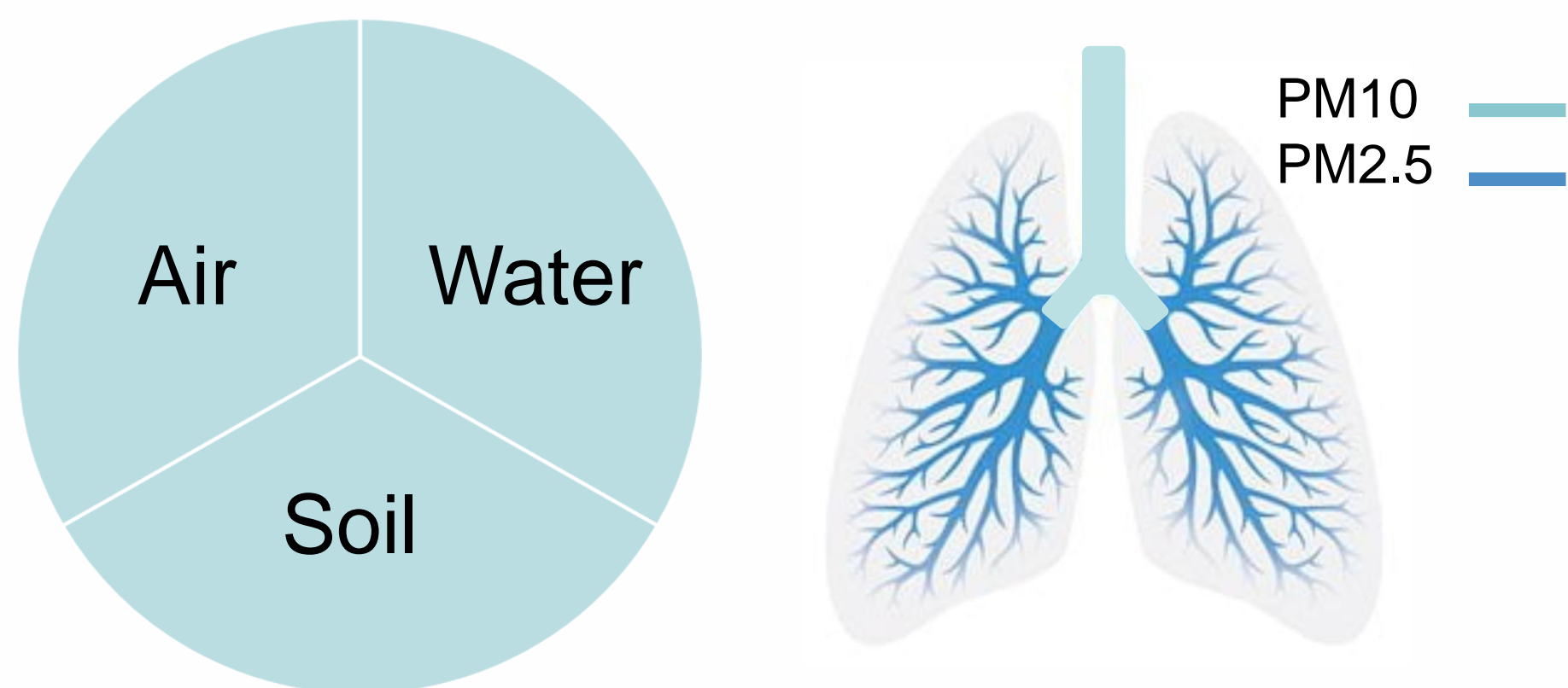


# Analysis of the mechanisms relating to tire-road wear in relation to the emissions of fine particles

Stepan BOBROVNIKOV (PhD student 2022-2025)  
Supervised by: Manuela GENNESSEAU, Minh-Tan DO  
AME-EASE, Université Gustave Eiffel, F-44344, Bouguenais, France

## TRWP Emission

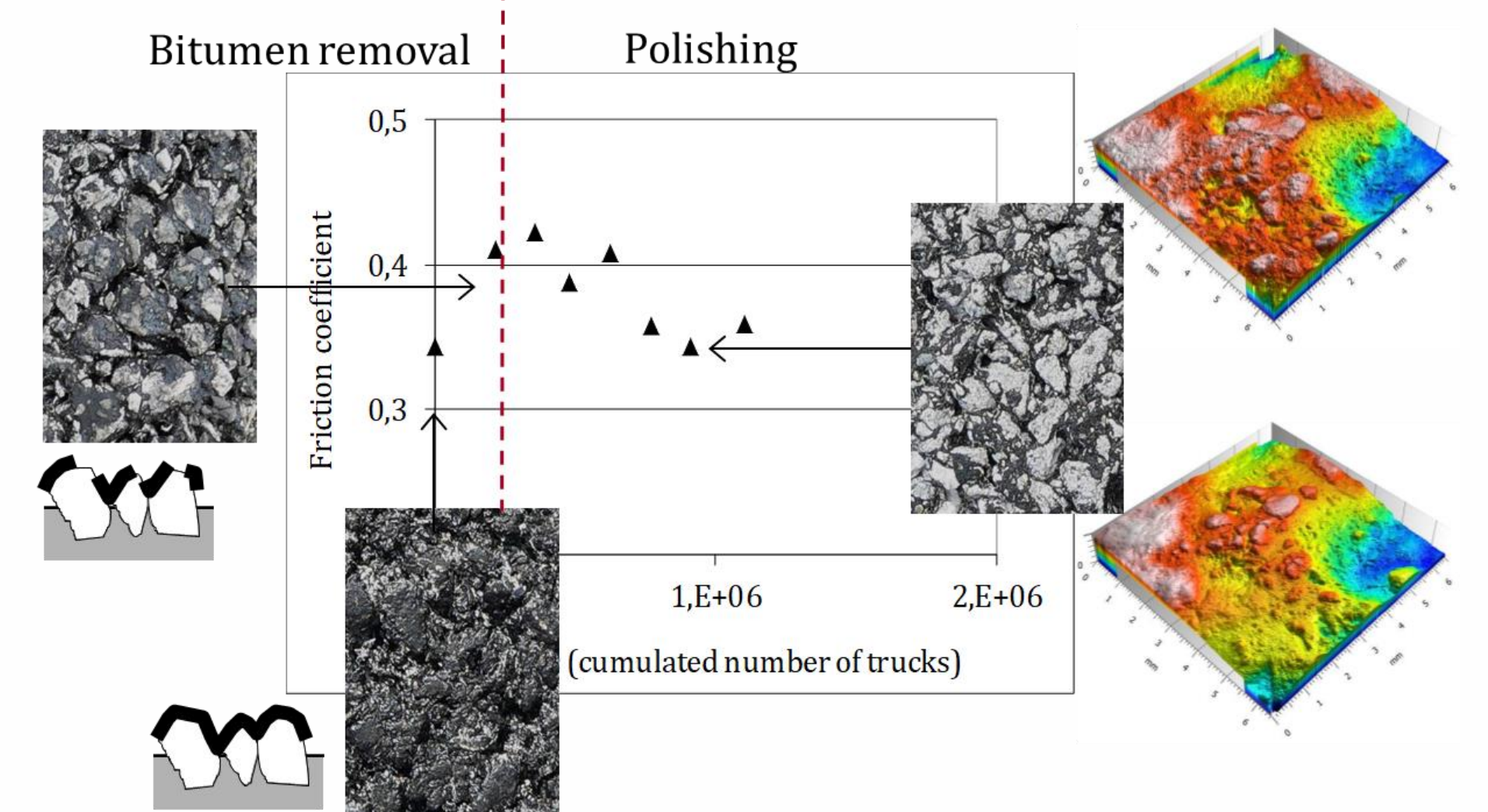


Tire-road wear particles (TRWP) are one of the main contributors of non-exhaust vehicular emission, PM2.5 can enter the bloodstream and lead to respiratory and heart diseases [1-2].

Safety of driving aspects in relation to skid resistance evolution, effect of asperities shape, presence of water at the contact zone were studied [3-4].

## Introduction

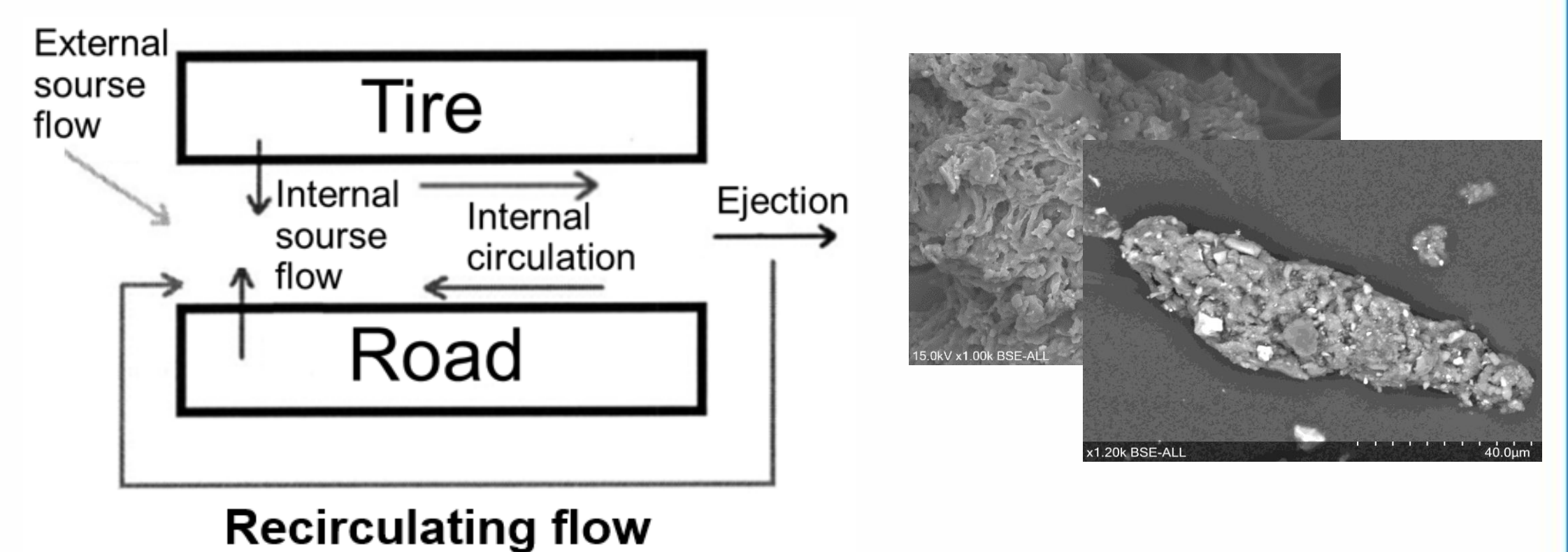
### Evolution of road skid resistance Assumed phenomena



## Research gap: Friction and wear evolution in relation to TRWP

## Objectives

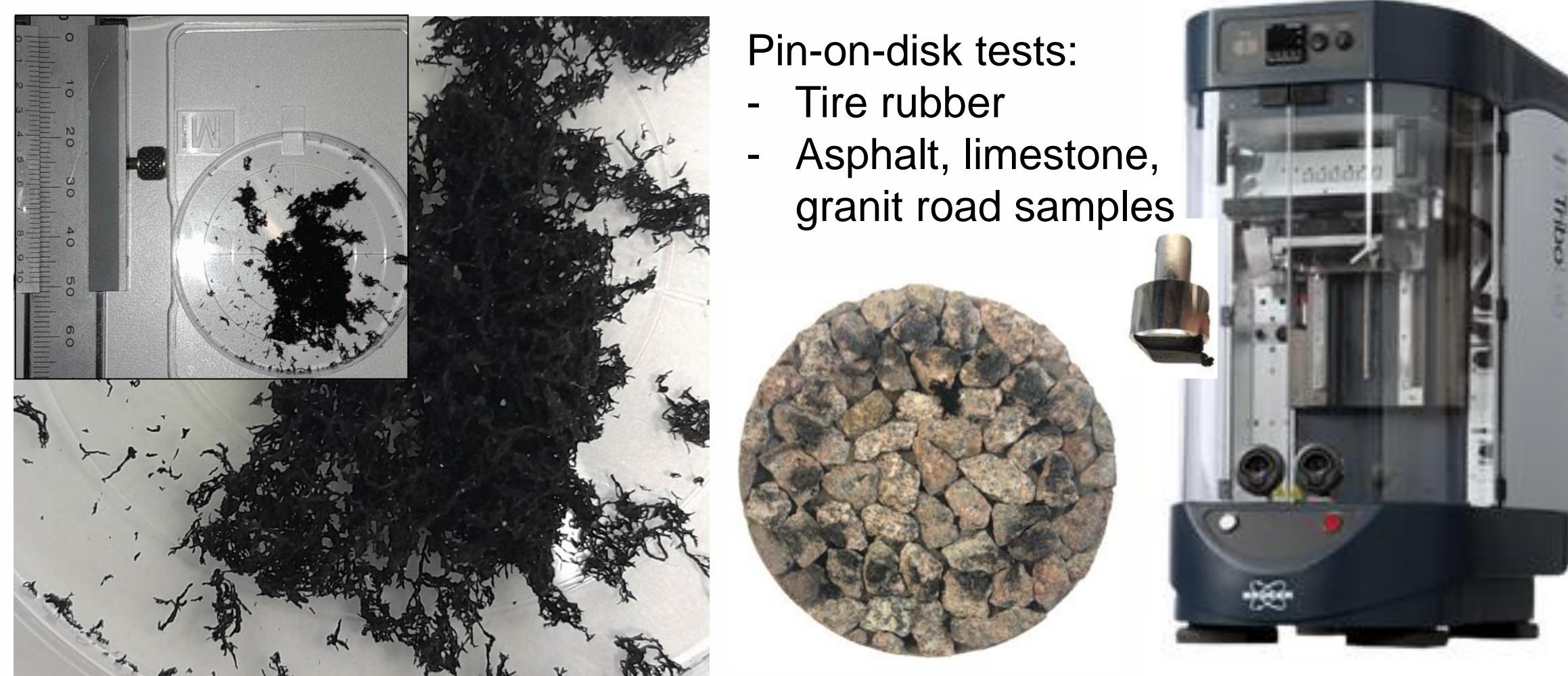
- Develop the methodology to characterize the particles produced by tire-road wear
- Understand the flows of TRWP at the tire-road interface [5]
- Understand mechanism of wear debris generation



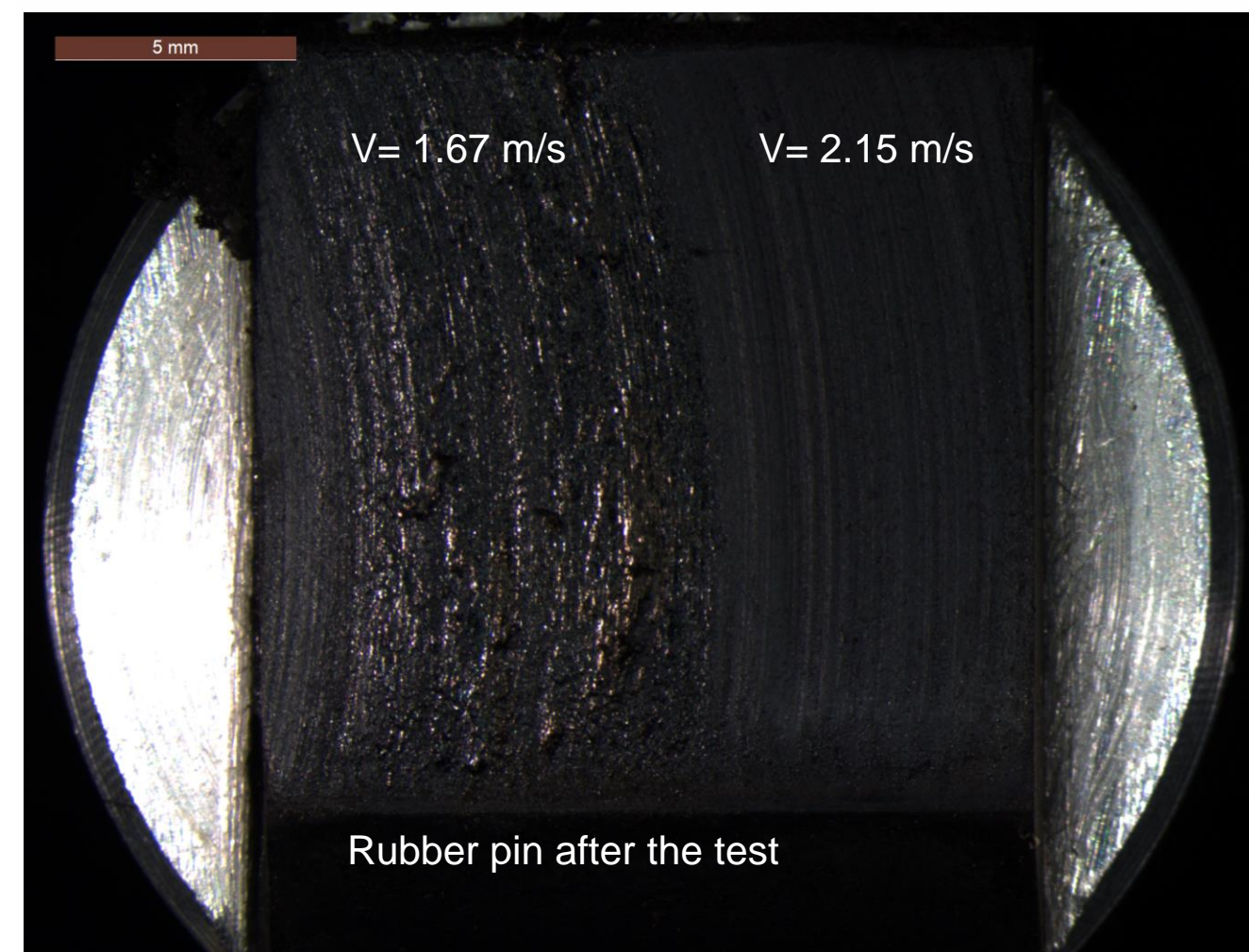
## Materials and Methods

### Scales:

#### 1. Microscale



#### 2. Contact scale



#### 3. Full-size scale

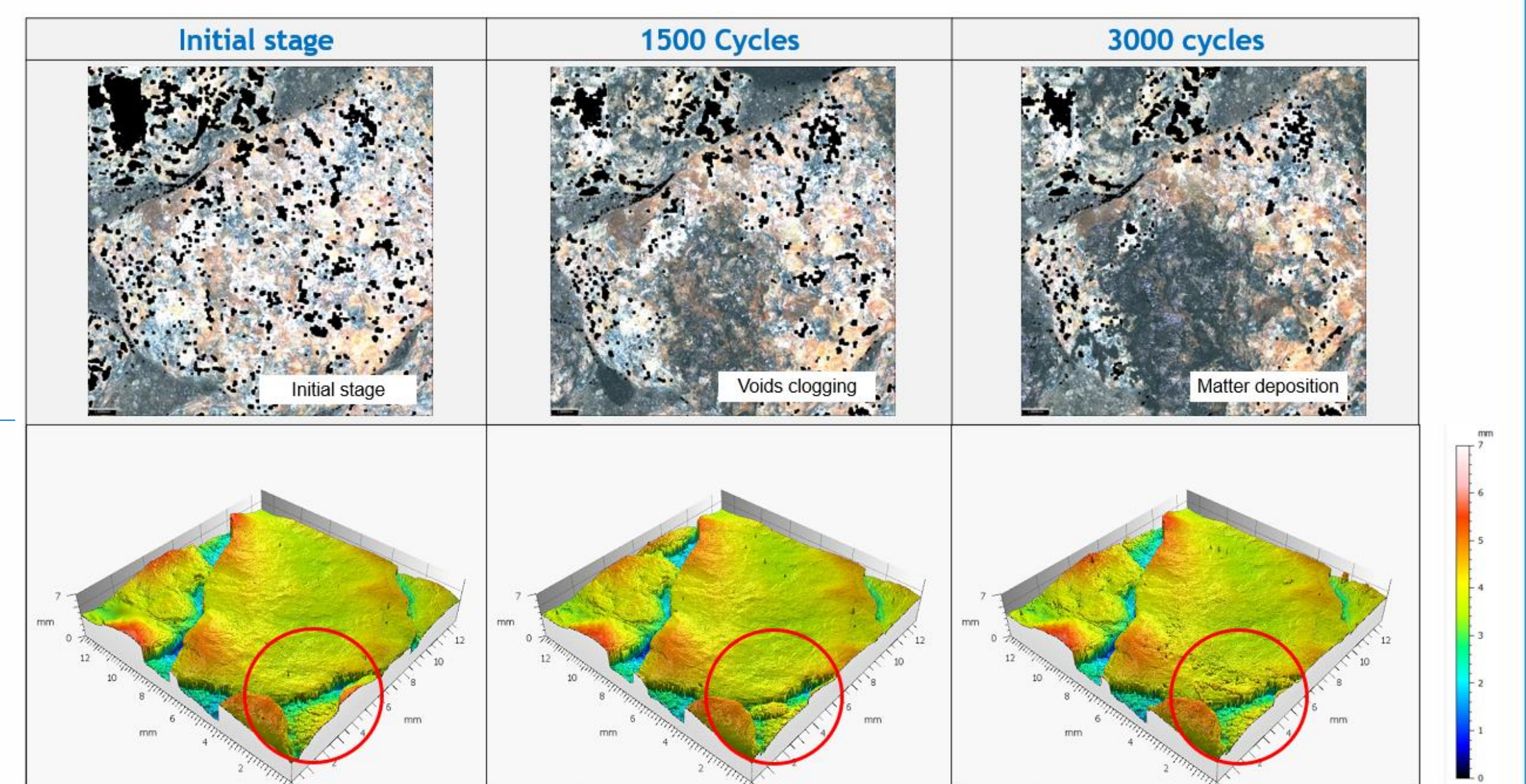


## Preliminary Results

- Progressive rubber deposition
- Voids clogging
- Non-linear friction variation in relation to particles deposition
- Different wear mechanisms within one sample observed

## First conclusions

- Friction is affected by deposition of particles and clogging of the void
- Chemical characterisation of TRWP is required



## Work plan

- Testing of different surface types
- TRWP SEM analysis
- Thermogravimetric analysis
- Link between morphology and wear mechanism
- Application of the tribological circuit concept

## References

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- [3] R. W. Lowne, "The effect of road surface texture on tyre wear," *Wear*, vol. 15, no. 1, pp. 57–70, Jan. 1970
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