



*J.Pic, M.Fressard , É.Cossart – 25th of may 2022*

# **Assessment of sediment connectivity in a densely drained vineyard catchment: contributions from graph theory**



# Conceptual framework

1



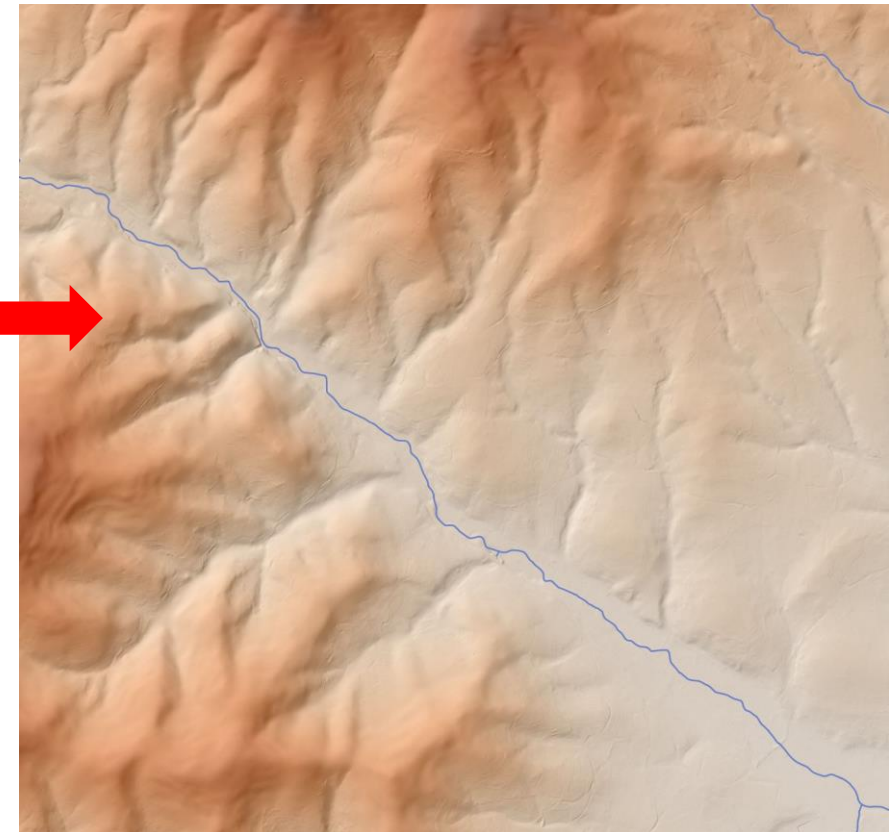
**Landscape structure** determines :

- Sediment availability
- Sediment pathways
- Water and sediment (de)coupling
- Connectivity patterns

# Conceptual framework



Excerpt of a 1m resolution DEM



**TO INTEGRATE** →

Landscape structure determines :

- Sediment availability
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# Conceptual framework



*Spatial pattern of sediment transfer within a densely structured landscape, Villié-Morgon – Beaujolais (France)*

# Spatial framework



*A typical view on the Beaujolais vineyard (France)*

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8 km<sup>2</sup> catchment – **360 meters per hectare** of anthropogenic drainage infrastructures

*Soil bund along a grassed track*



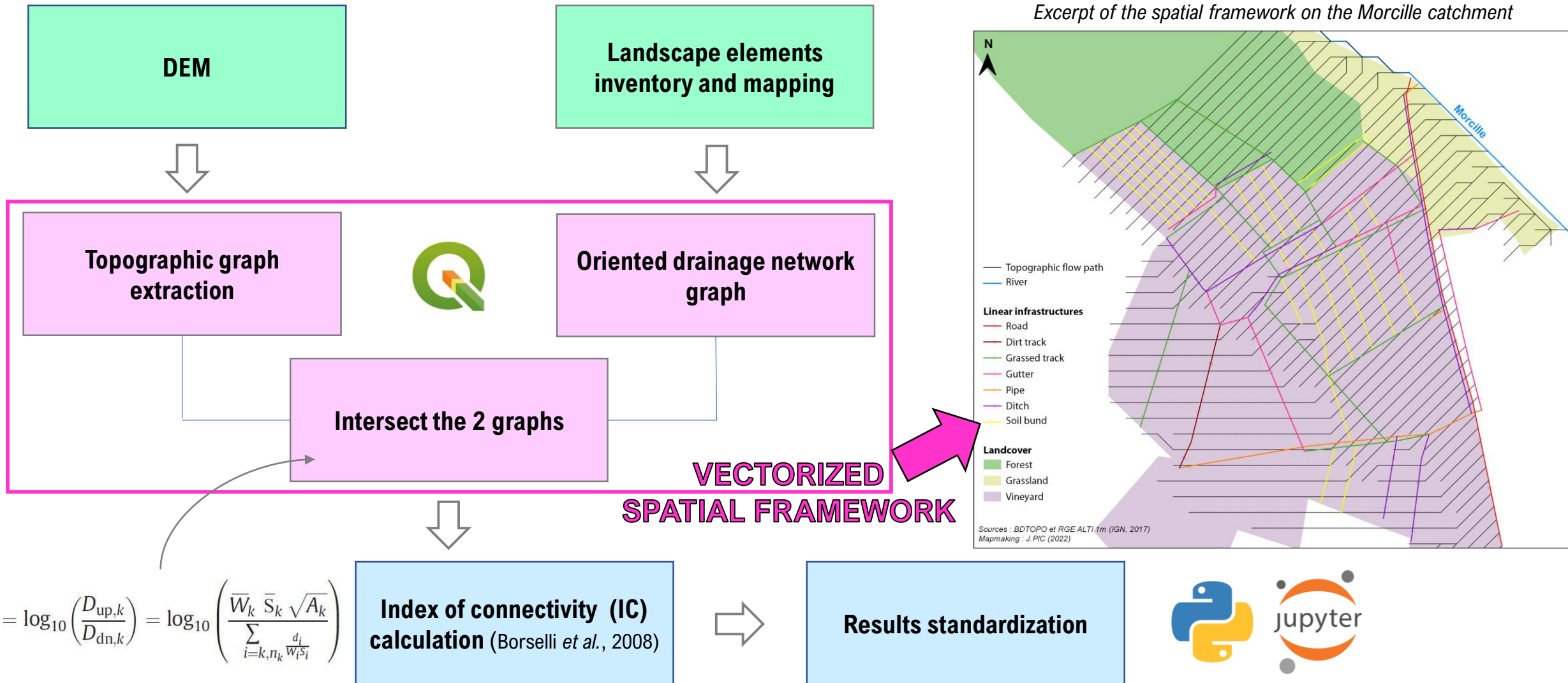
*Mid-plot gutter*



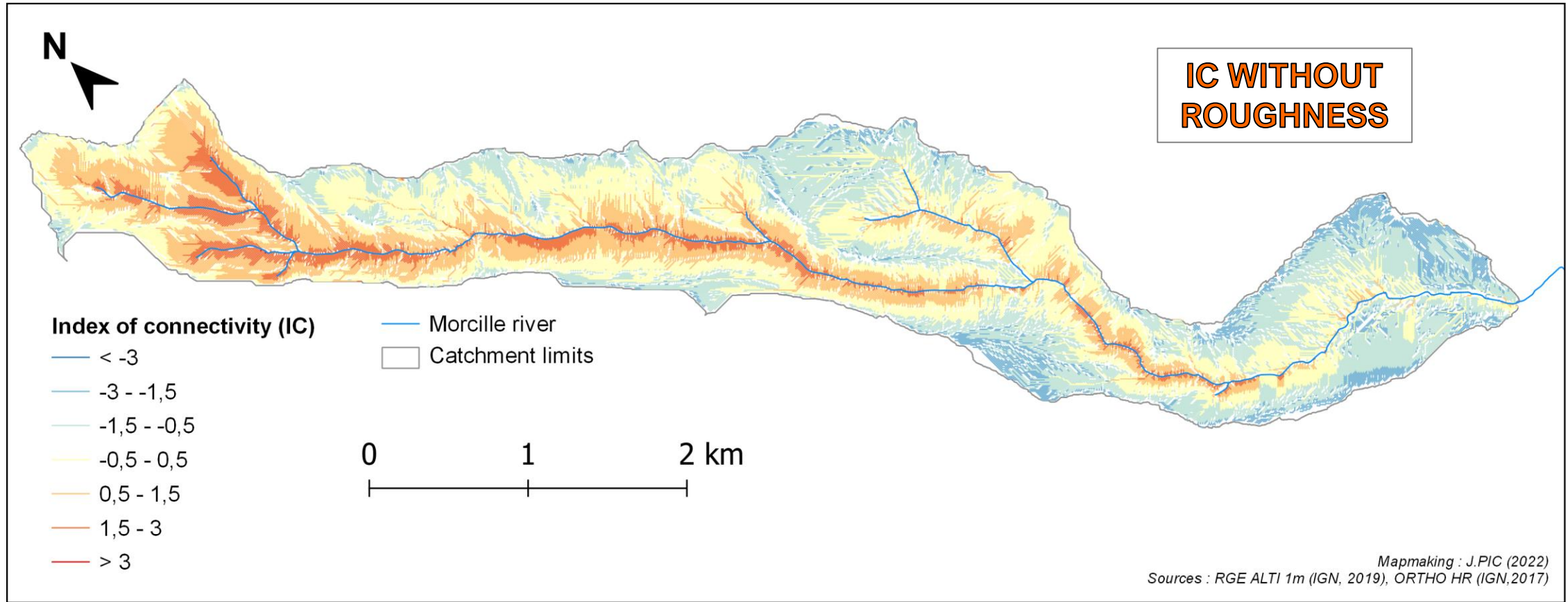
*Sediment trap and its collected sediments*

# Methodological framework

**GOAL:** To integrate all landscape elements in sediment connectivity assessment



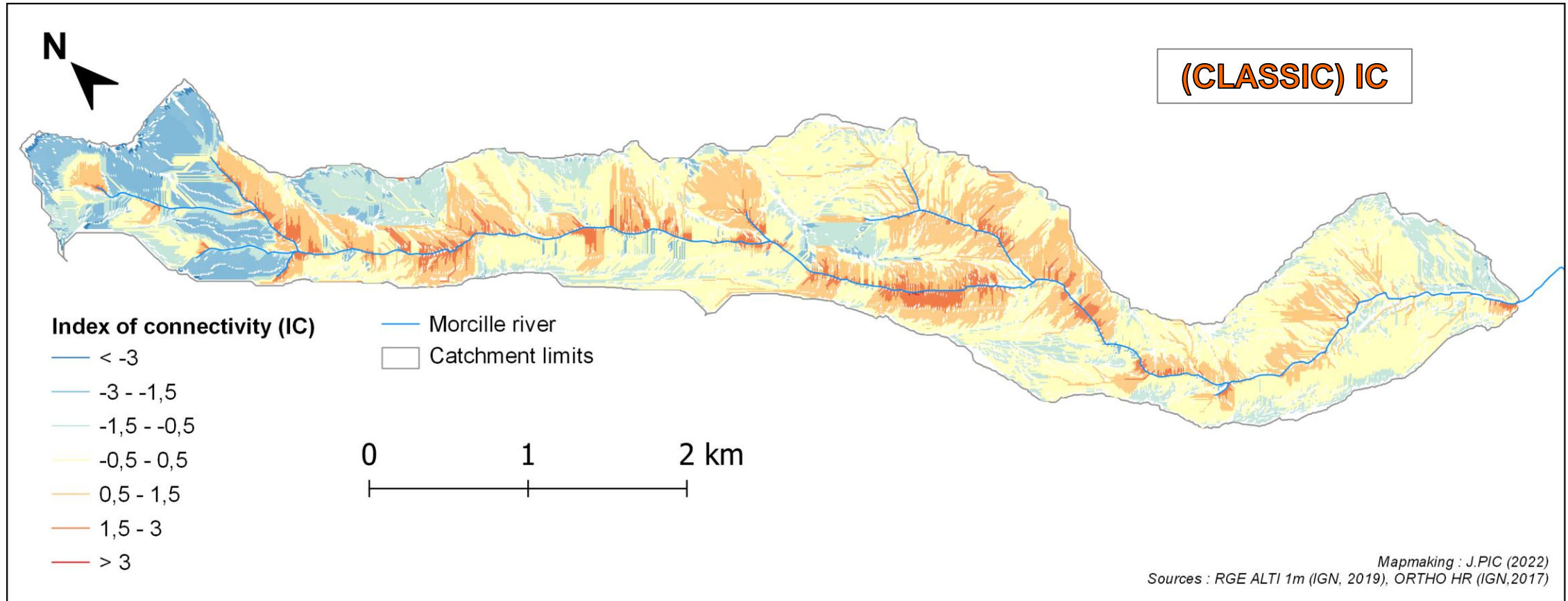
# Landscape effects on connectivity



*Index of connectivity without landuse (IC bare), Morcille catchment (Beaujolais, France)*

- **IC bare:** highest connectivity in the upper catchment and along the river

# Landscape effects on connectivity



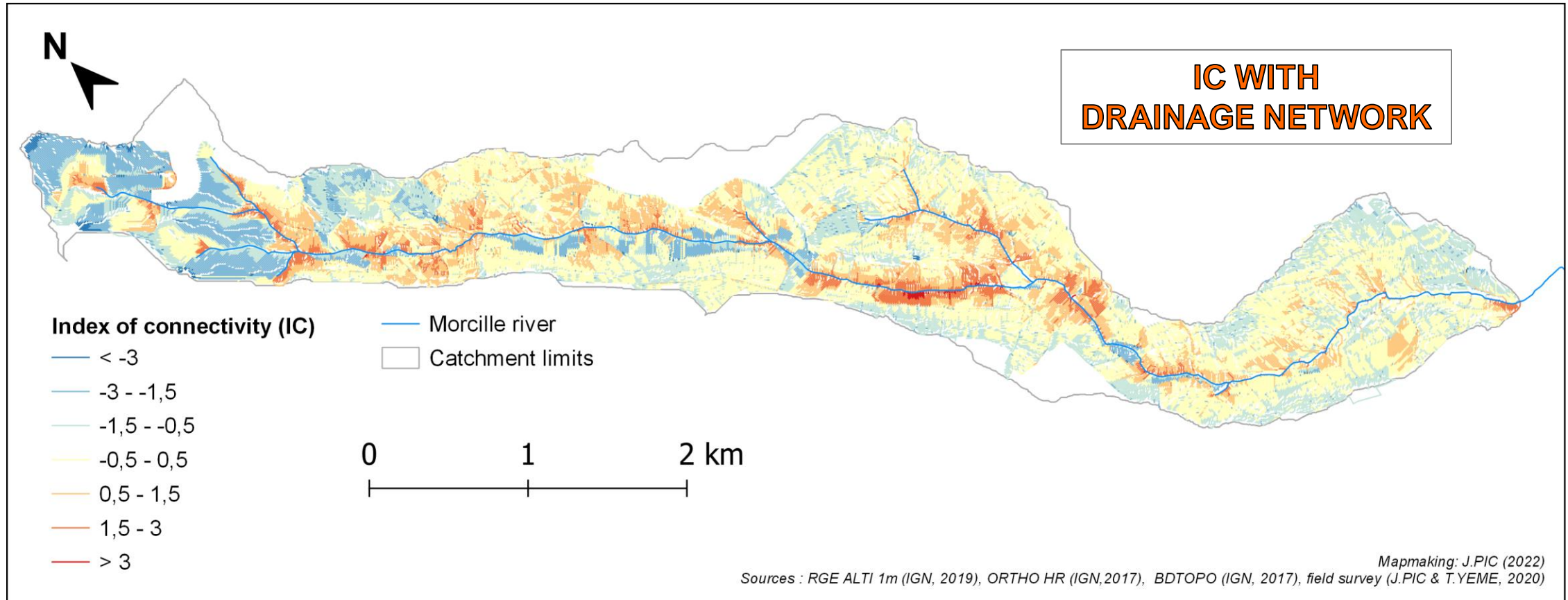
*Index of connectivity (IC), Morcille catchment (Beaujolais, France)*

- **IC:** highest connectivity in the vineyard and urban areas



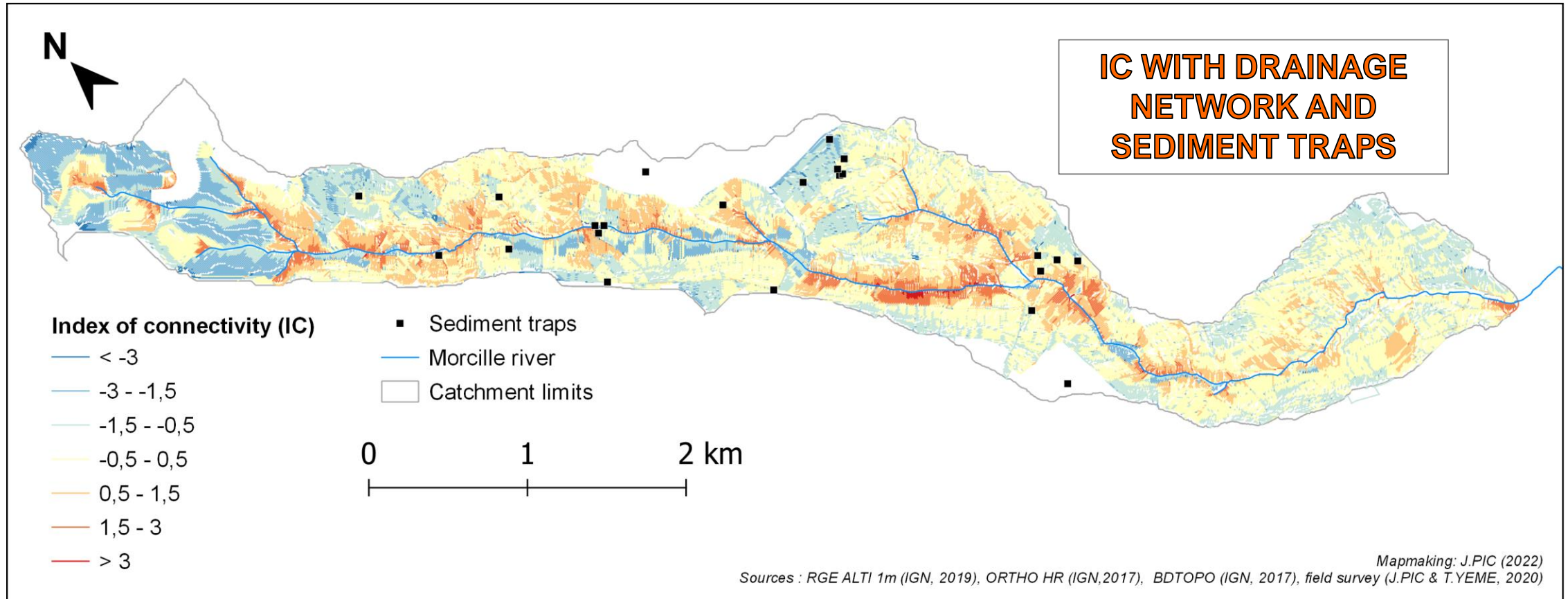
# Landscape effects on connectivity

5



*Index of connectivity including the drainage network (IC drainage), Morcille catchment (Beaujolais, France)*

- **IC drainage:** more fragmented connectivity in the vineyard + disconnected zones



*Index of connectivity including the drainage network and the sediment traps (IC traps), Morcille catchment (Beaujolais, France)*

- **IC traps:** decrease of connectivity in the zones connected to a sediment trap

**GOAL:** To integrate all landscape elements in sediment connectivity assessment



Application of the **IC** within a **vectorized landscape framework**



**Effects of the landscape structure on connectivity**

- Fragmented landscape through the drainage network → fragmented connectivity



**Relevant spatial structure** for sediment transfer and connectivity assessment in agricultural catchments

**GOAL:** To integrate all landscape elements in sediment connectivity assessment



Application of the **IC** within a **vectorized** landscape **framework**



**Effects of the landscape structure on connectivity**

- Fragmented landscape through the drainage network → fragmented connectivity



**Relevant spatial structure** for sediment transfer and connectivity assessment in agricultural catchments



**Thank you for your attention!**

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