

Coping with nonstationarity

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- Climate change (having the potential to profoundly transform both ecological and cultural landscapes).
- Land change (from relatively pristine natural ecosystems to completely human-dominated urban and industrial areas).

In 1920



- Less intense hydrologic dynamics
- Less vegetation along channels

In these days

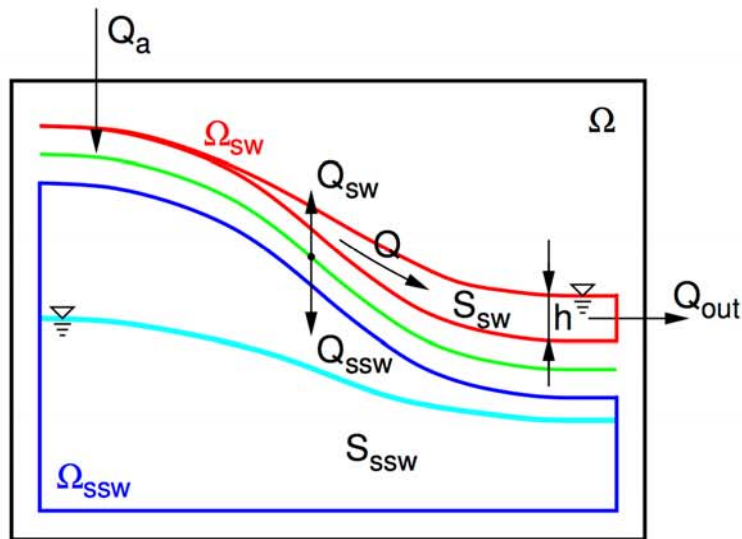


- More intense hydrologic dynamics
- More vegetation along channels

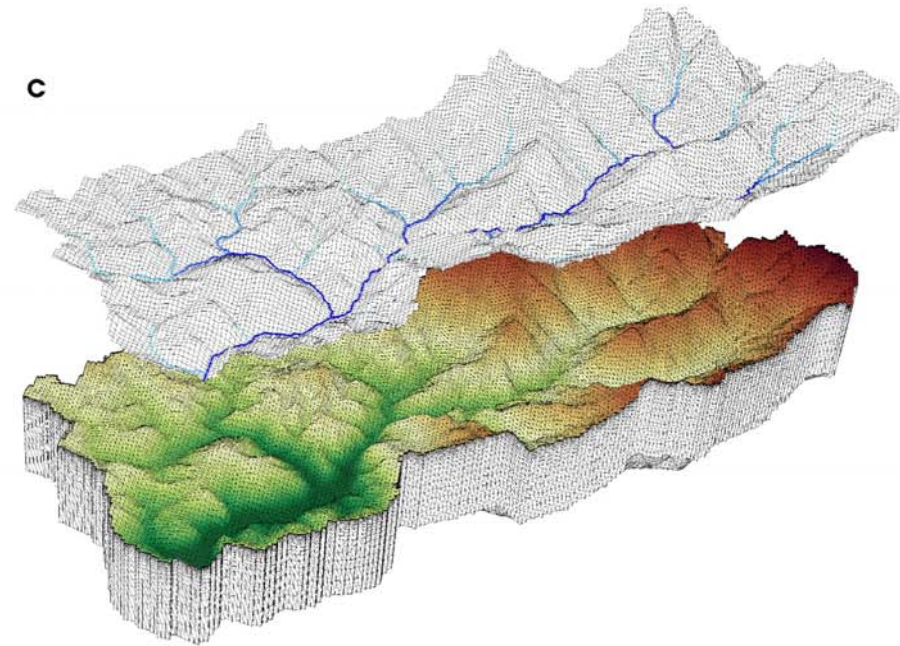
The CATchment HYdrology (CATHY) model

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Surface-subsurface flow interaction



Distributed modeling

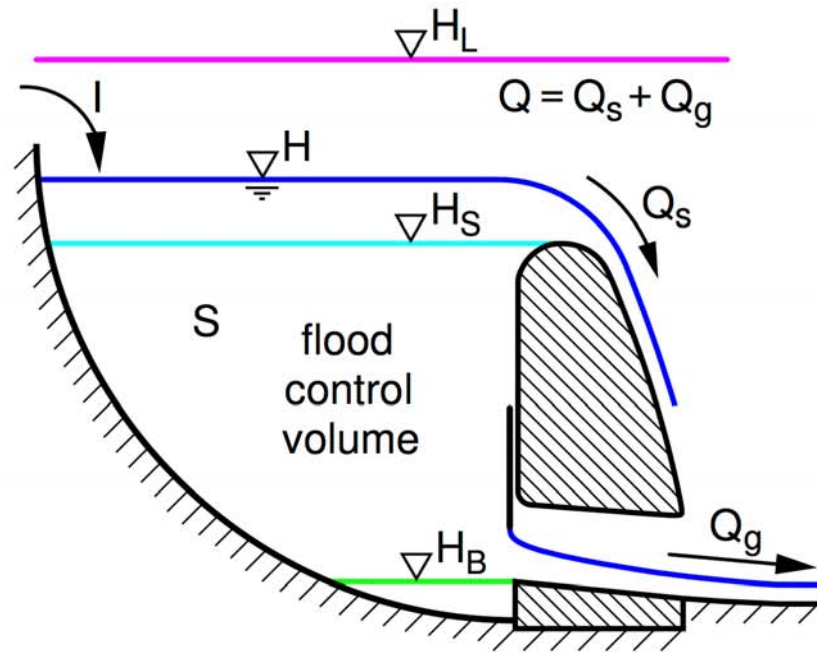


- Understand and predict/forecast the dynamics of runoff, sediments, and solutes.
- Identify the best flood protective measures.

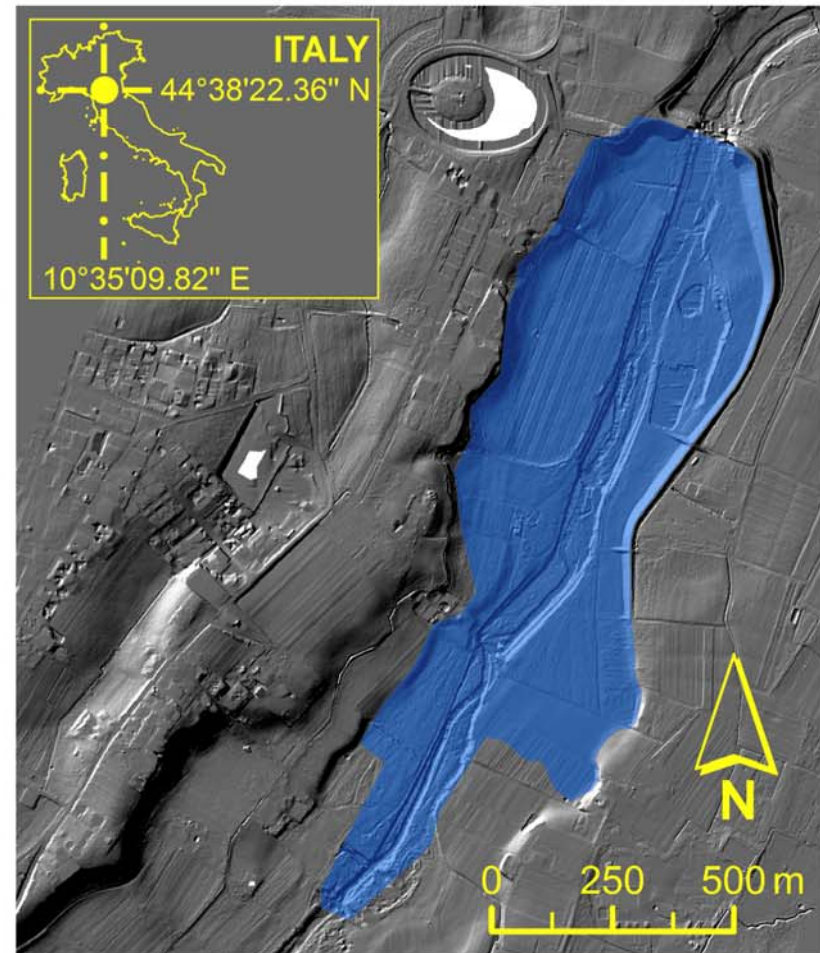
Reservoir routing

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Flood control reservoir

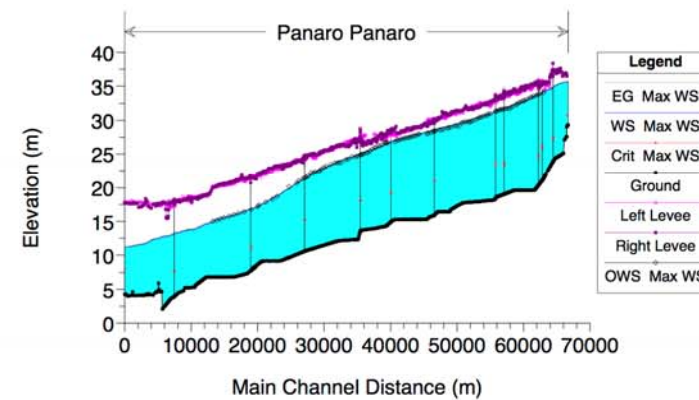
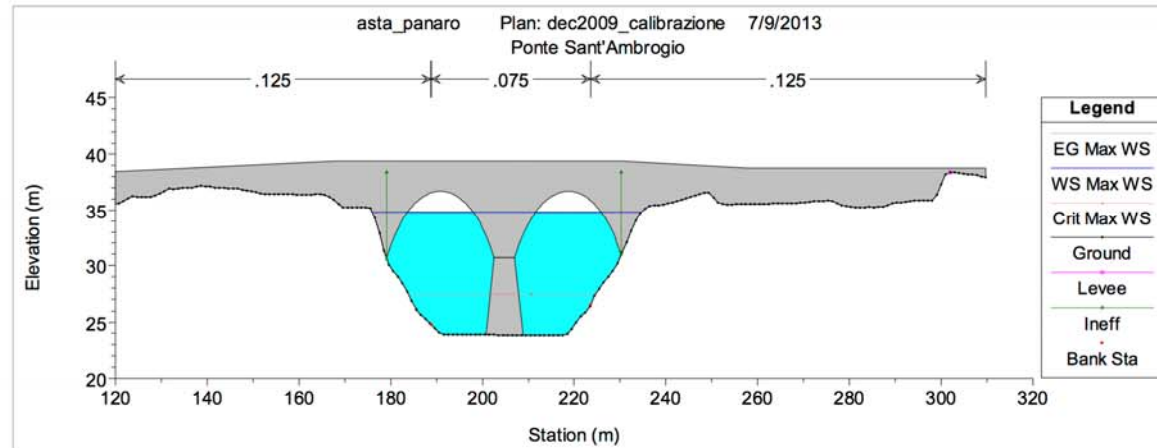
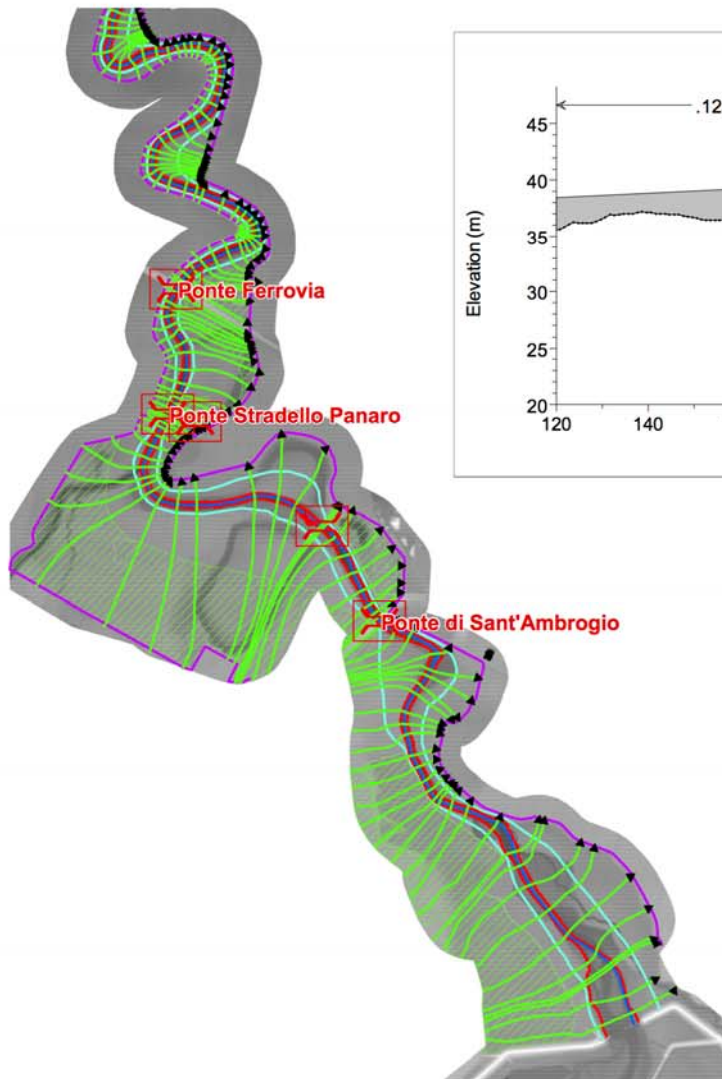


Lidar survey



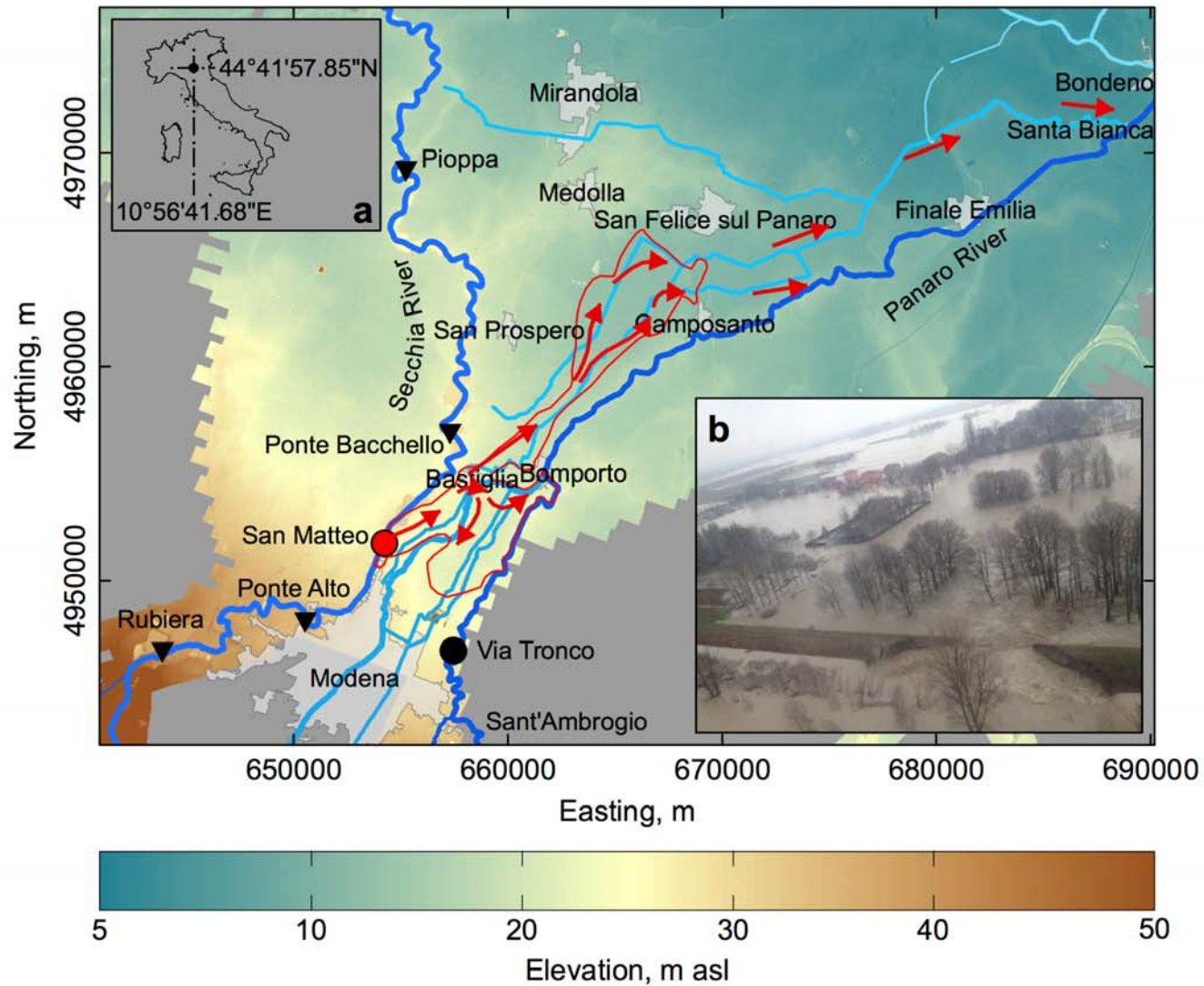
River channel routing

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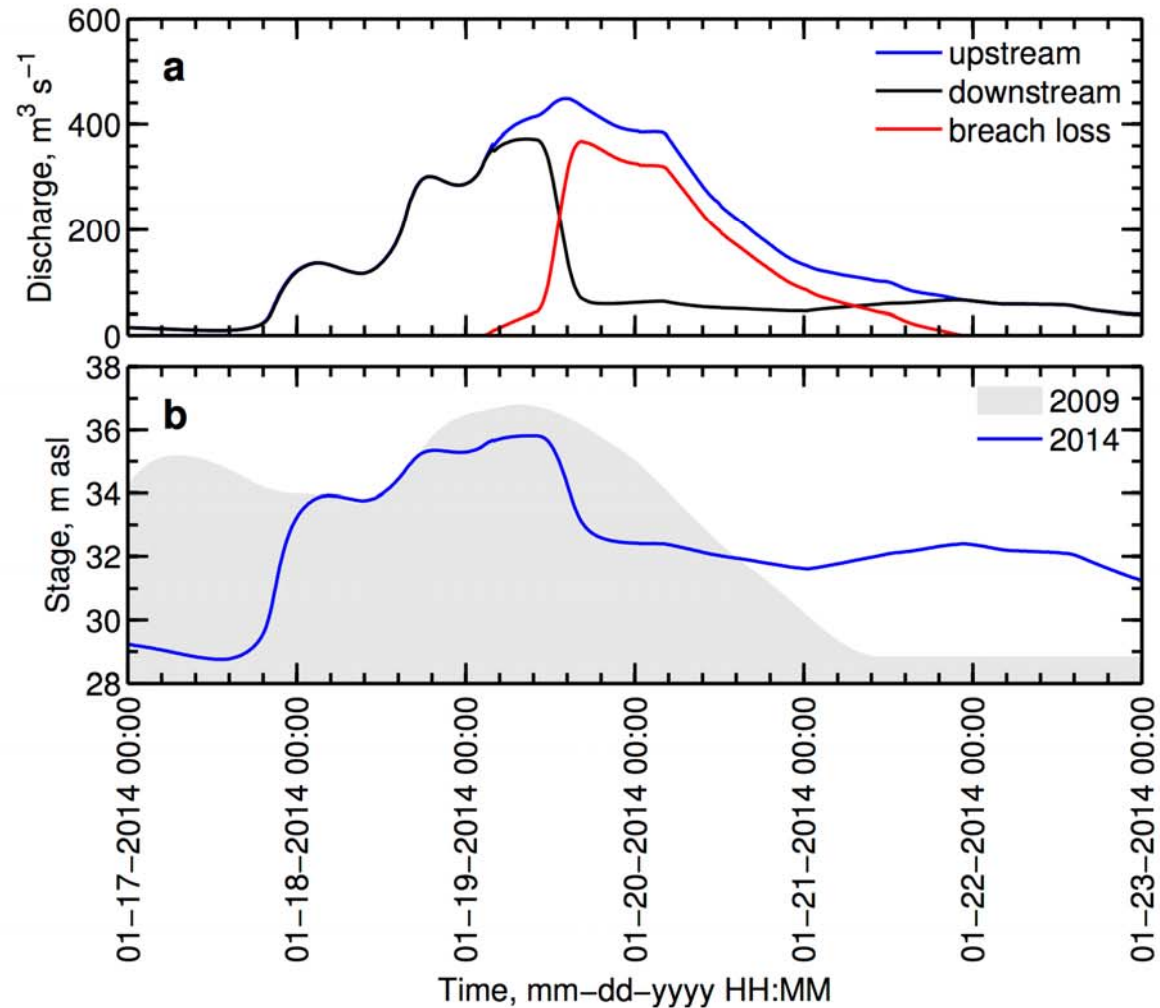
Levee failure along the Secchia River at San Matteo, Modena

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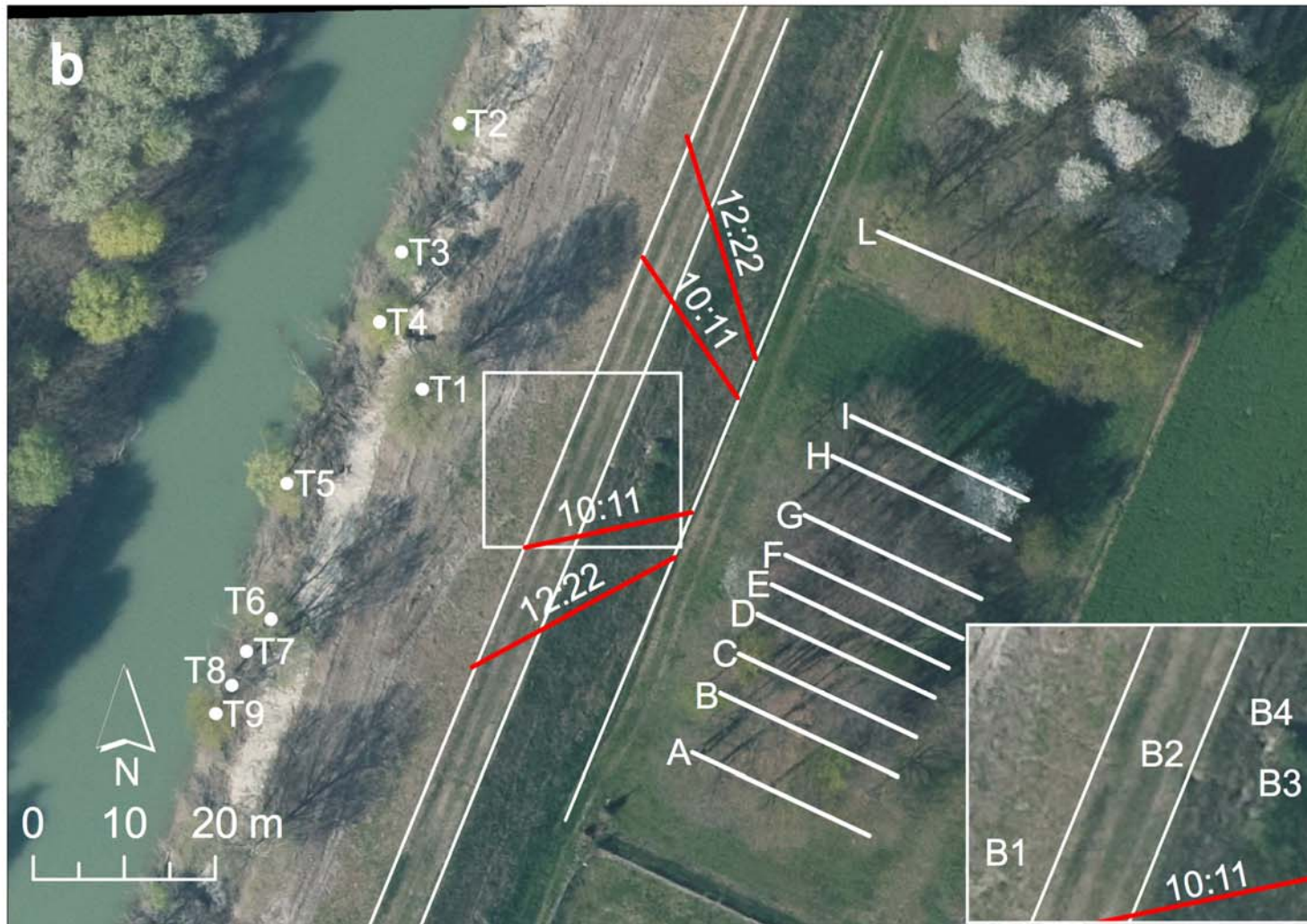
Flow discharges and stages at the location of the levee failure

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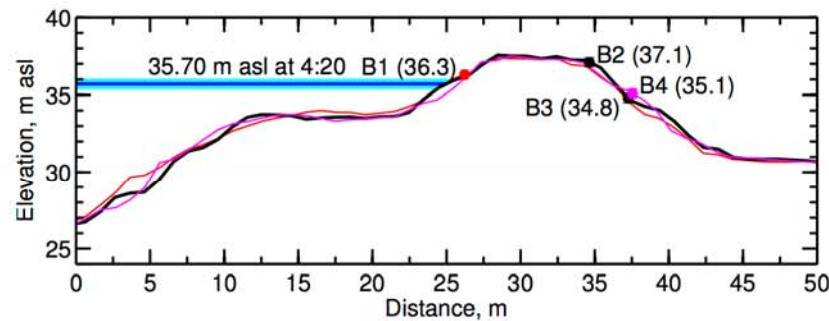
Position of animal burrows in March 2012

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Ecohydrological Risk

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- Bring these processes to the attention of hydrologists.
- Trigger an interdisciplinary discussion on habitat fragmentation and shifts due to development and climate pressures.

