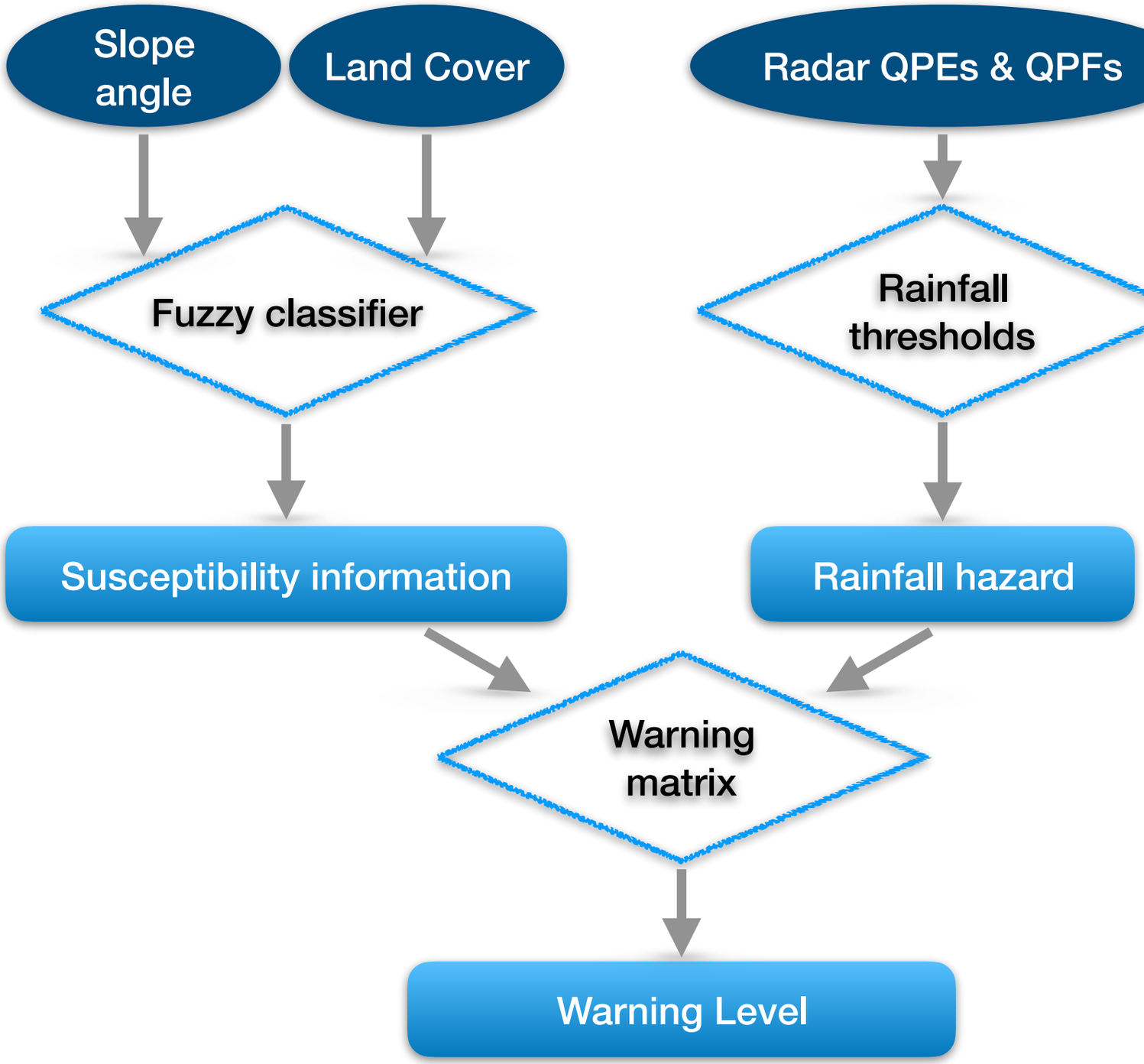
An early warning system for rainfall-triggered shallow slides and debris flows.

Rosa M Palau, Marc Berenguer, Marcel Hürlimann, Daniel Sempere-Torres, Catherine Berger, and Adrian Peter

Source: @ajsantpol

General scheme Methodology

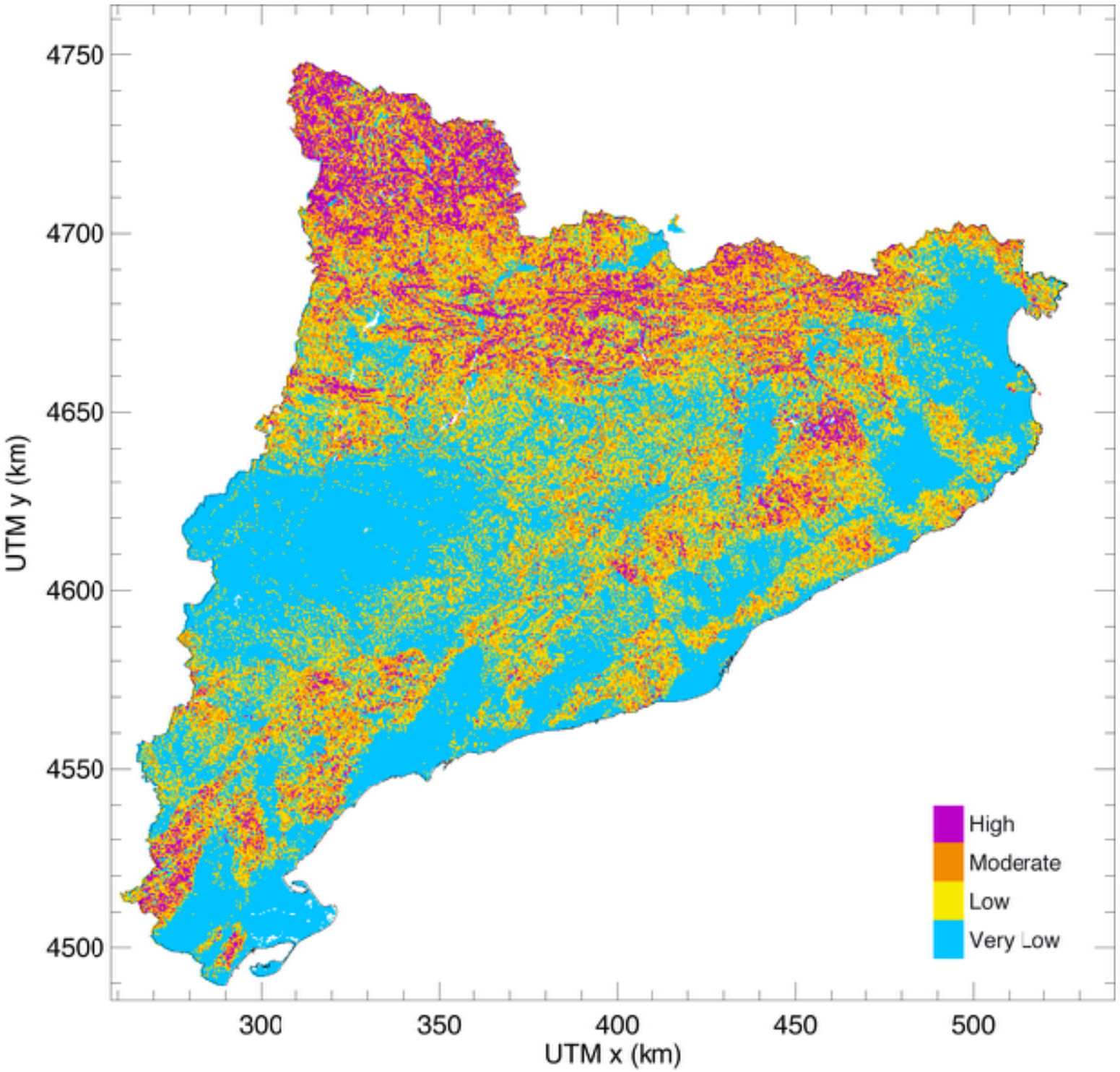


The LEWS has the purpose of issuing **real-time warnings to the authorities** in charge of managing the risk.

Susceptibility and **rainfall** information are combined in order to produce a **qualitative warning level map**.

Susceptibility assessment

Adapted from Palau et al. (in press) Landslides



The susceptibility map is used to distinguish the areas that are prone to landslides.

Susceptibility input parameters can be easily found in most regions:

- Slope angle
- Land use and land cover

Both input parameters are combined using a fuzzy logic classifier.

The resulting susceptibility maps for **Catalonia and Canton of Bern** have a **resolution** of **30 m**

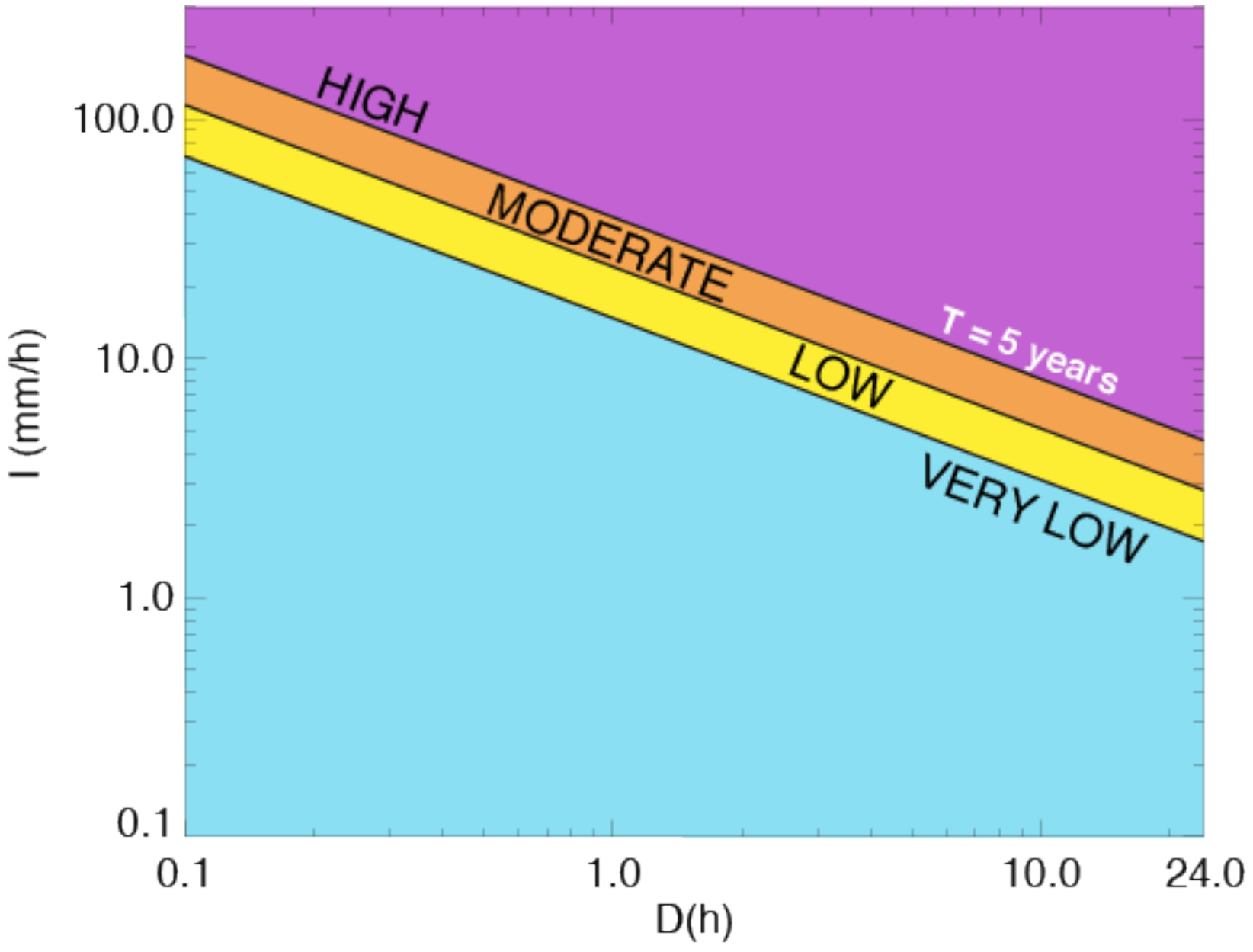
Rainfall hazard assessment

Rainfall data is used to asses if the rainfall conditions are able to trigger a landslide. The prototype LEWS may use both; high resolution weather radar observations and forecasts.

In the region of **Catalonia** the rainfall information has a **spatial resolution of 1 km** and is updated every **30 min**.

To asses the potential that a rainfall event has to trigger a landslide, IDF curves have been used to define four rainfall hazard levels.

Adapted from Palau et al. (in press) Landslides



Definition of the warning level

- Susceptibility is combined with the rainfall hazard in real time every time new rainfall infoı

Susceptibility

Rainfall Hazard Level	Susc Very Low	Susc Low	Susc Moderate	Susc High
Rain Very Low	VL	VL	VL	L
Rain Low	VL	L	L	M
Rain Moderate	VL	L	M	H
Rain High	L	M	H	H

Adapted from Palau et al. (in press) Landslides

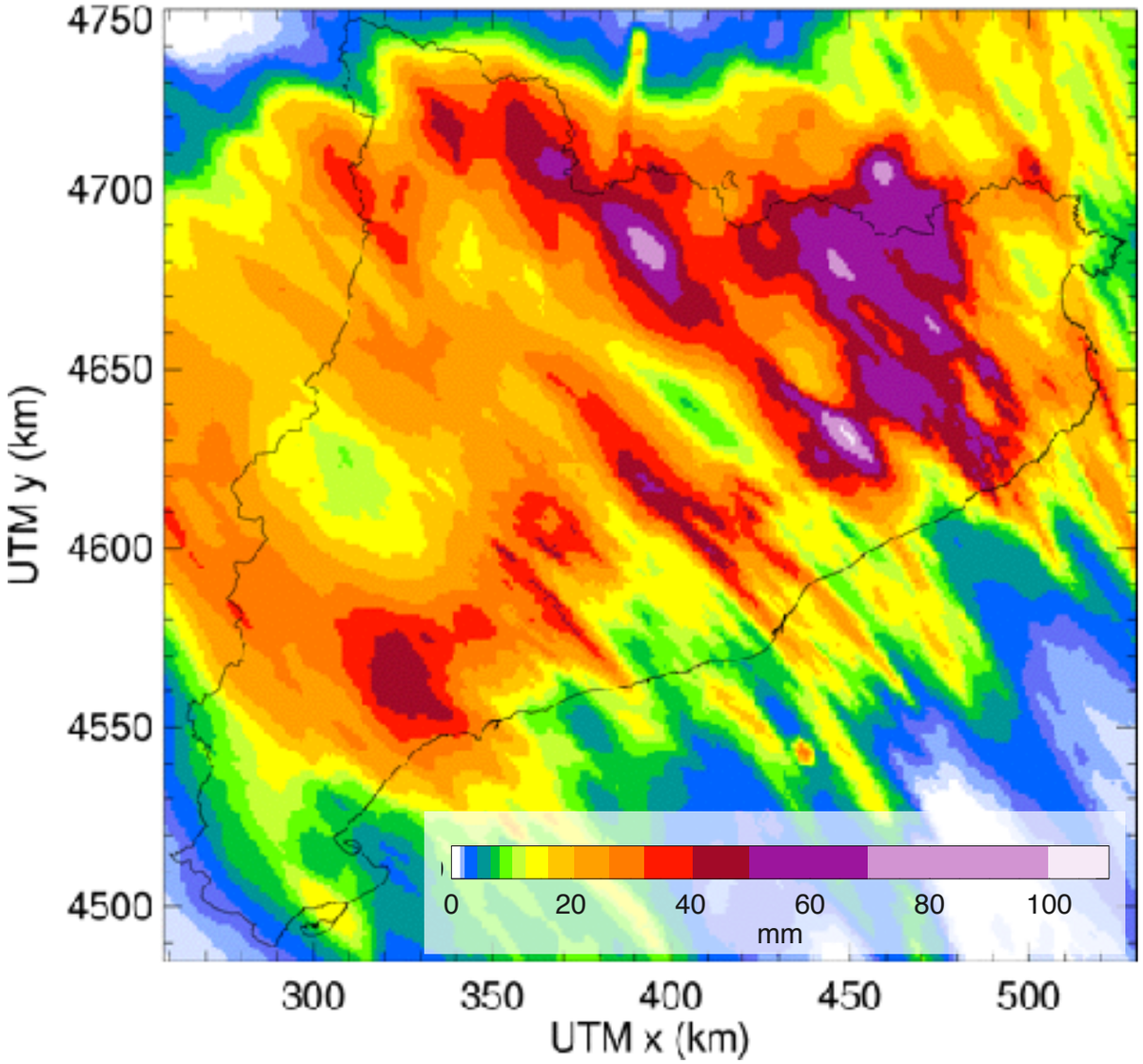
Warning Outputs

Every 30 min	30 m resolution warning map Subbasin summary of the maximum 30 m warning
Daily	Subbasin 24h warning level summary

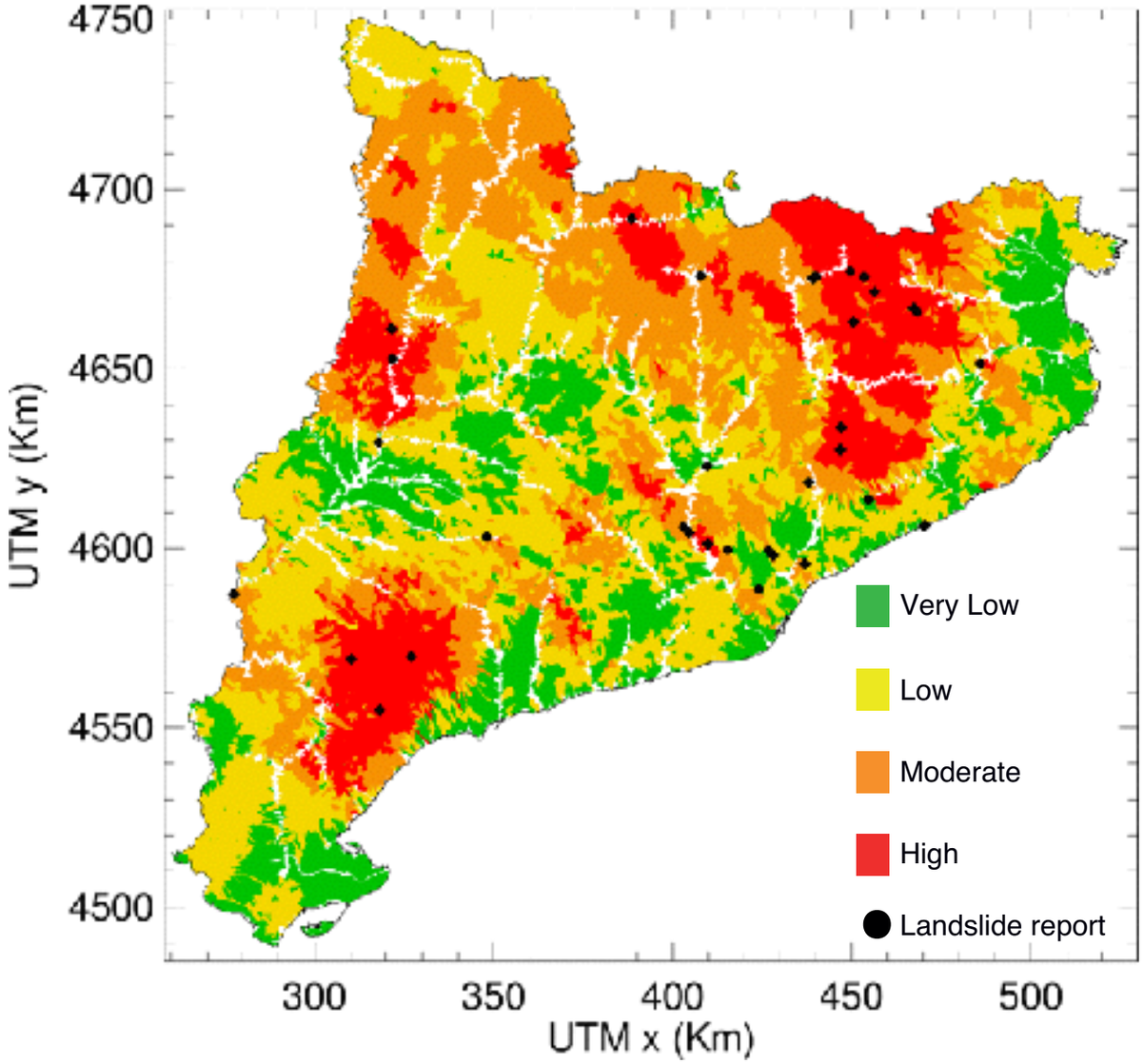
Results of the LEWS application in Catalonia

The prototype LEWS is currently running in real time using rainfall observations as input data at the university servers in Barcelona

Rainfall accumulation 23/01/2020 00:00-24:00



Daily warning level summary 23/01/2020



Generally, the LEWS is able to issue warnings for the reported landslide events. However, more work needs to be done in order to further reduce the number of false positives and misses.

Thank you!

Find me:

palau@crahi.upc.edu

Rosa M Palau Berastegui

@RosaPalauB

Centre de Recerca Aplicada en Hidrometeorologia

UNIVERSITAT POLITÈCNICA DE CATALUNYA

Generalitat de Catalunya
Departament d'Empresa i Coneixement
Secretaria d'Universitats i Recerca

Unió Europea
Fons social europeu
L'FSE inverteix en el teu futur

Palau RM, M. Hürlimann, M. Berenguer, D. Sempere-Torres, 2020: Influence of the mapping unit for regional Landslide Early Warning Systems. Comparison between pixels and polygons in Catalonia (NE Spain). Landslides (In press) doi: 10.1007/s10346-020-01425-3.

Unknown source