Clarity

The climate impact assessment marketplace

Data, tools and services for the efficient check of urban infrastructure

CLARITY Transport Infrastructures

CLARITY Webinars

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Spain transport infrastructure network:

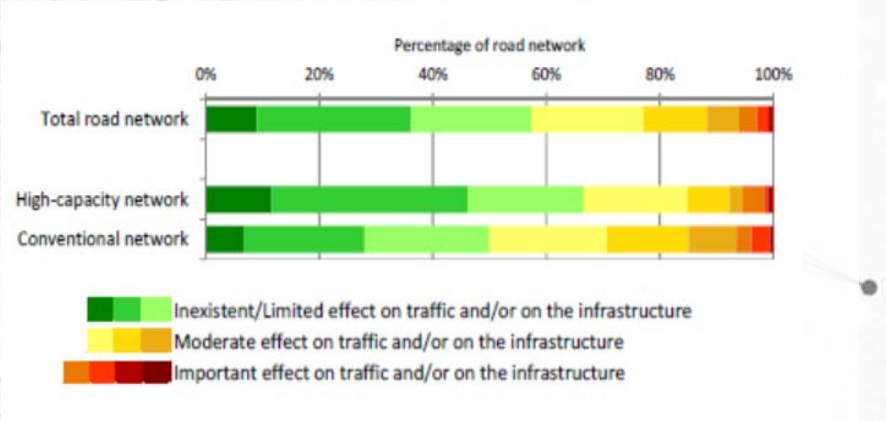
26,038 km highways	165,000 km of roads
2,655 km high-speed train	15,399 km of railway

Climate challenges

At present…

45% impacted by weather events

6% suffers important impacts



Identify main hazards:

Climatic variable	Road element
Maximum temperatures	Pavement rutting
Minimum temperatures	Pavement cracking
Number of days T < 0ºC	Winter maintenance
Intense rainfall	Drainage
Fire index	Road manintenance

Affection to daily traffic

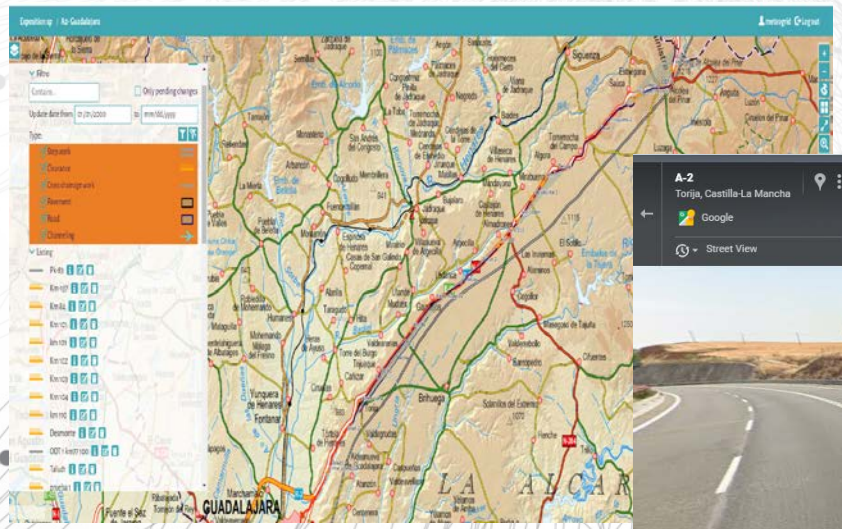
Spanish predictions by AEMET

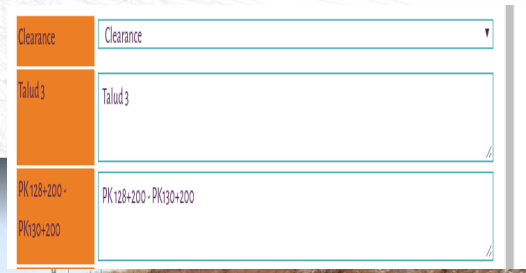
+ prediction by CLARITY Project for the whole Europe

Exposure analysis

Creation and edition of road elements that might be impacted by climate events

Definition of user-modifiable attributes

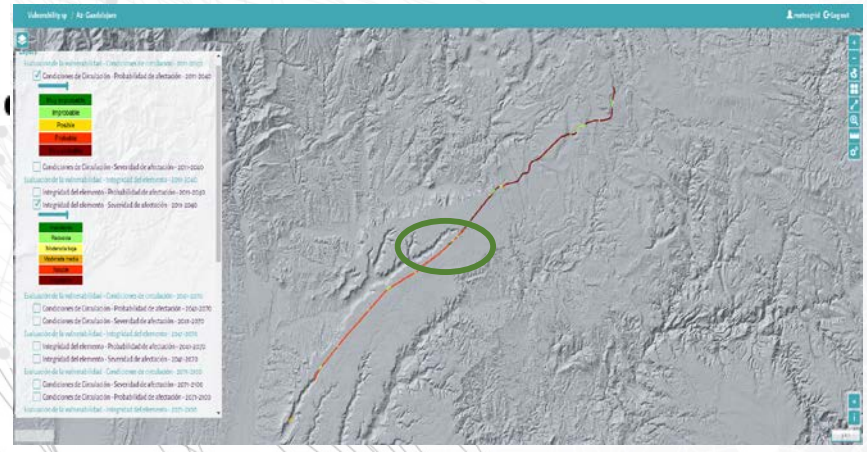




Vulnerability analysis

Study of the **severity** and **probability** of climate hazards on the exposed elements, taking into account **exposure** and **sensibility**, by means of expert criteria

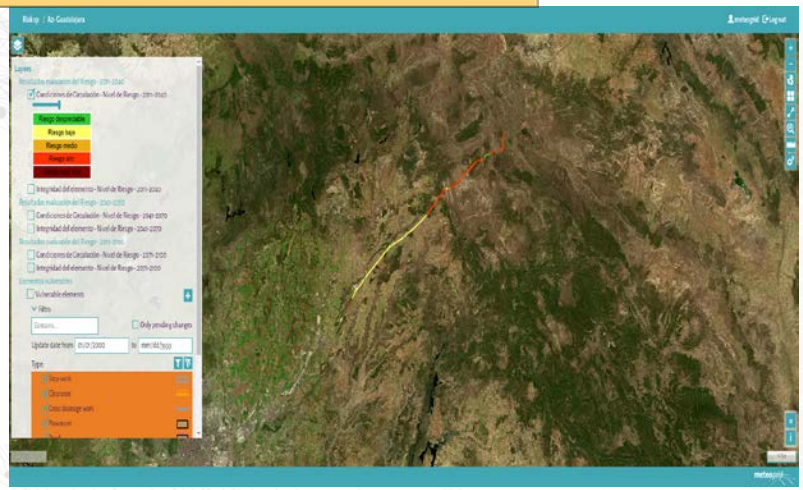
Element	Vulnerability	Element integrity			Circulation conditions		
		2011-2040	2041-2070	2071-2100	2011-2040	2041-2070	2071-2100
Talud 1	Severity	Moderada alta - 4	Moderada alta - 4	Moderada alta - 4	Moderada baja - 3	Importante - 6	Reducida - 2
	Probability	Posible - 3	Posible - 3	Posible - 3	Posible - 3	Posible - 3	Posible - 3



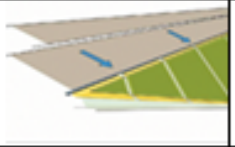
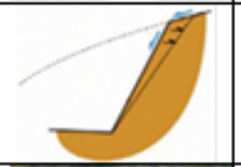
Risk analysis

Automatic risk evaluation based on the probability of affectation and the severity, both for traffic conditions and for the integrity of the element in the short, medium and long term

Element type	Element	Element integrity			Circulation conditions		
		2011-2040	2041-2070	2071-2100	2011-2040	2041-2070	2071-2100
	Km 84	-	-	-	-	-	-
	prueba 1	Despreciable	Alto	Desconocido - 0	Medio	-	-
	Desmonte 1	Alto	Despreciable	Alto	Medio	Medio	Alto
	Talud 1	Bajo	Bajo	Bajo	Despreciable	Alto	Despreciable



Adaptation Measures

Main potential hazards and impacts	Element at risk	Adaptation measures		Average Cost	Cost Scale	Expected Efficiency
Falling materials and erosion as a consequence of intense rainfall	Traffic conditions	Afforestation of slopes with drought-resistant species		8,6 €/m²	1	A-B
		Implementation of erosion control blankets or other type of protection (drains, berms, anchors, gunite or others)		11,5€/m²	2	A-B
		Reduce the slope of the cut Soft soils: 6€/m³ Rock soils 20€/m³		13€/m³ (average)	3	A-B
		Improvement of road maintenance resources		24.000€/km	3	B
Structural movements in pontoon	Pontoon (pk 63+775)	Reinforcement of of the pontoon		105€/m	3	A

TENDERING AND DESIGN PHASES

Improved climate data for design.
Climate change vulnerability assessment.

CONSTRUCTION PHASE

Optimized works programme

OPERATION PHASE

Risk analysis and climate informed decision making procedure

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Please contact us to find out more about the CLARITY transport tool.

Webinars about the transport application coming!!