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Group of Experts on Climate Change Impacts and Adaptation for Transport Networks and Nodes

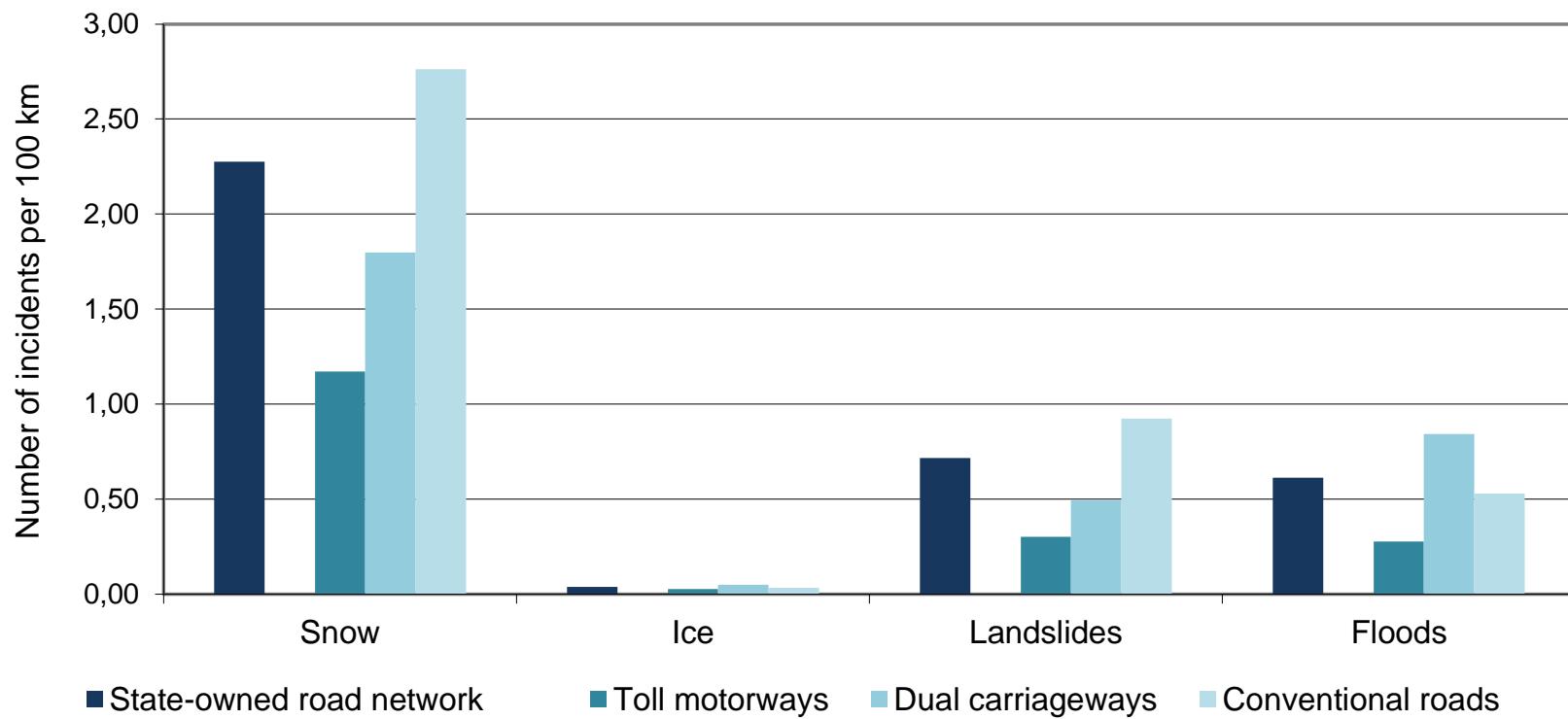
Geneva, 14-15 January 2016

**Climate change adaptation needs
of the core transport network in Spain**

Alberto Compte

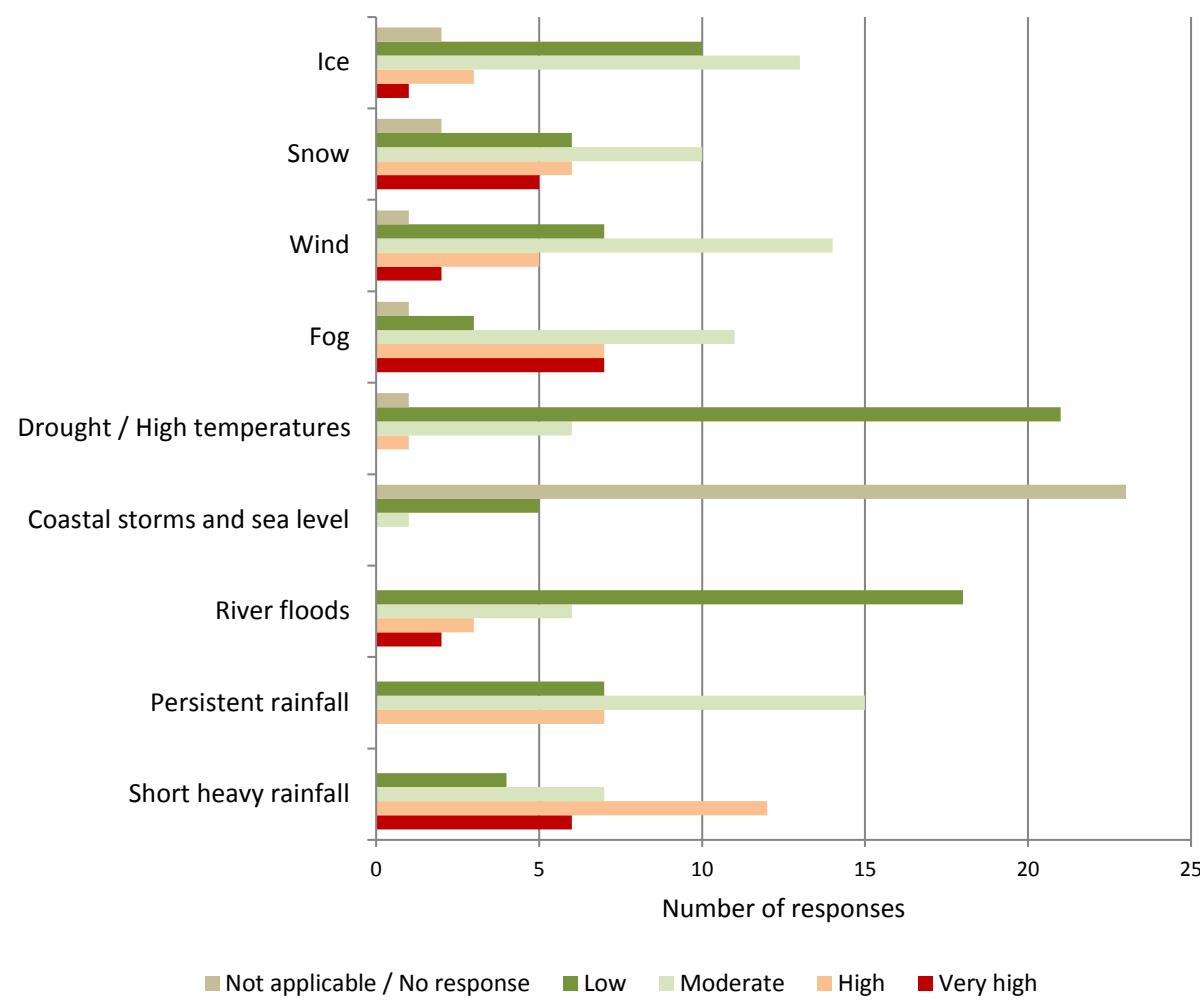
Current vulnerability of the road network to climate

Number of incidents per year recorded in the Tele-Ruta Service per 100 km, depending on road type
(Data from 2010 to 2012)



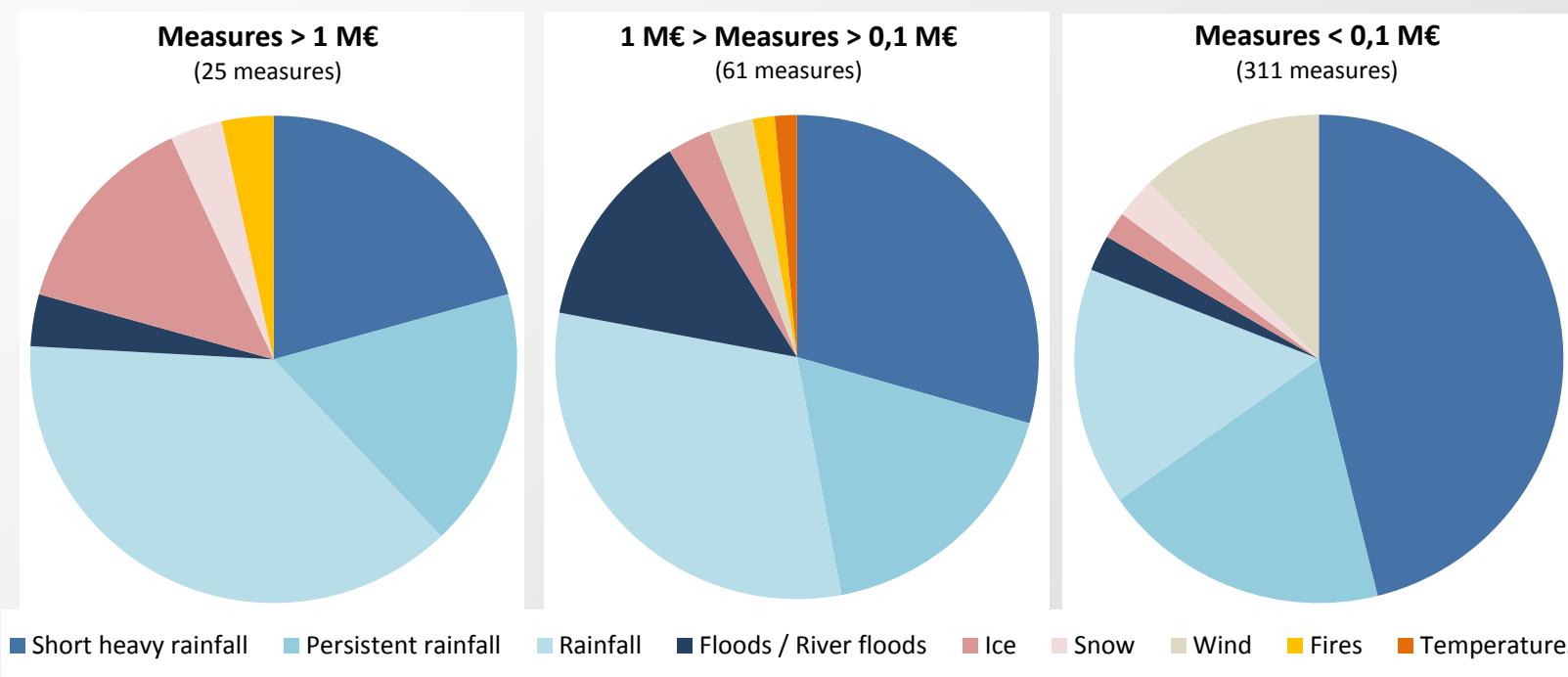
Current vulnerability of the road network to climate

The Road Units' perception of the current impact of different climatic factors on traffic conditions



Current vulnerability of the road network to climate

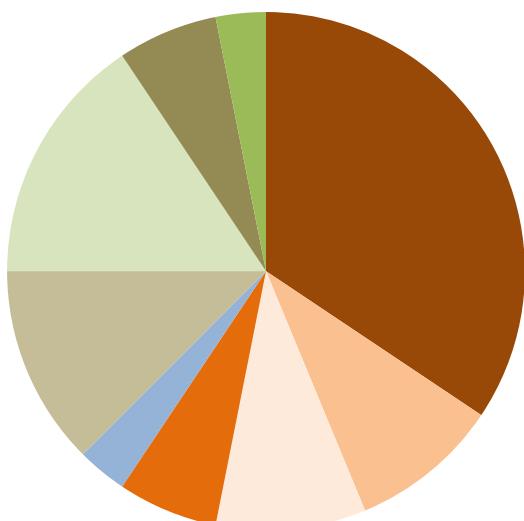
Main climatic events associated with remedial/rehabilitation measures on roads



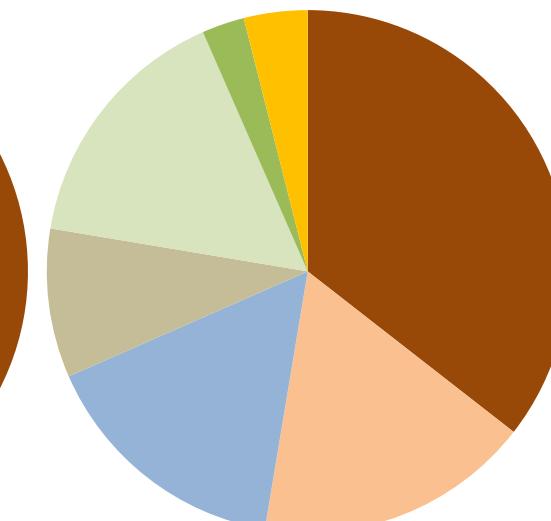
Current vulnerability of the road network to climate

Main road infrastructure assets on which remedial/rehabilitation measures have been performed due to climatic events

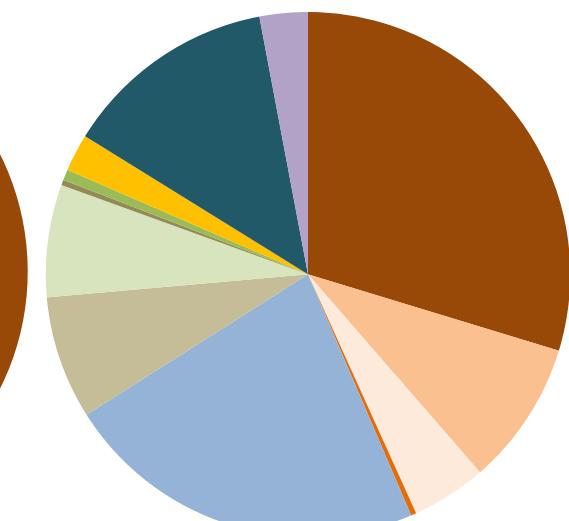
Measures > 1 M€
(25 measures)



1 M€ > Measures > 0,1 M€
(61 measures)



Measures < 0,1 M€
(311 measures)



Cut slope

Drainage

Vegetation

Embankment

Pavement

Protection works

Cut slope / Embankment

Structures

Signing & Traffic guidance equipment

Subgrade

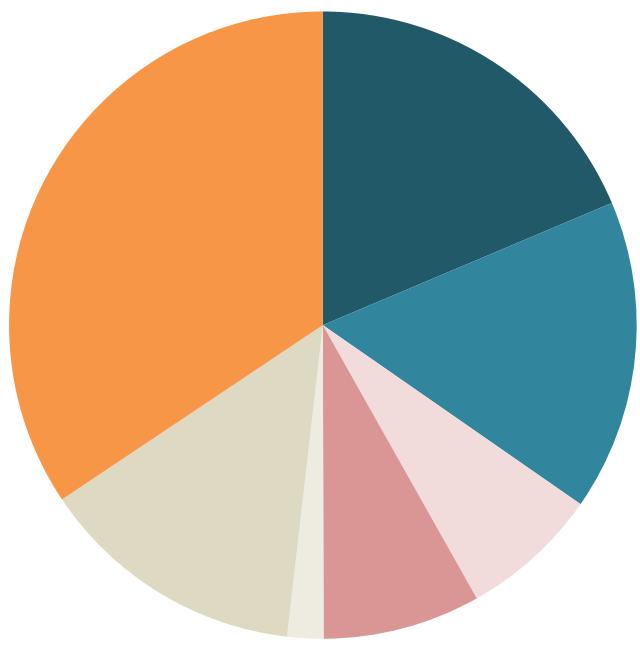
Tunnel

Others

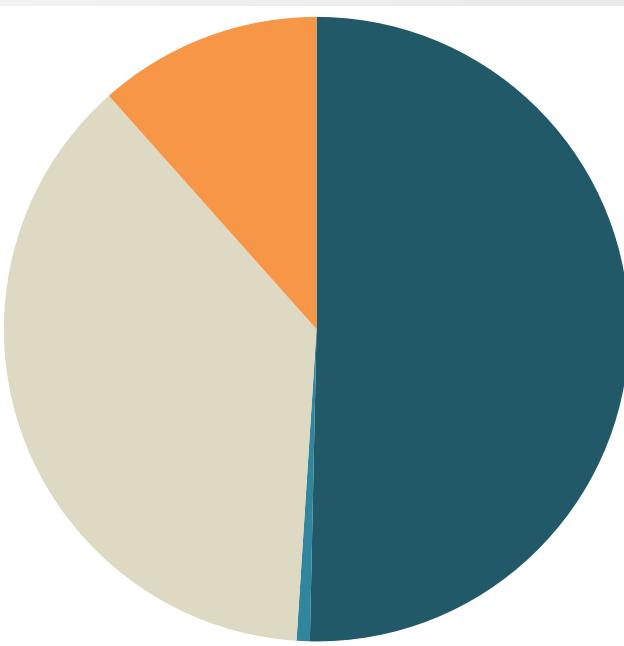
Current vulnerability of the rail network to climate

Average annual distribution of incidents caused by weather events recorded by ADIF

Conventional network



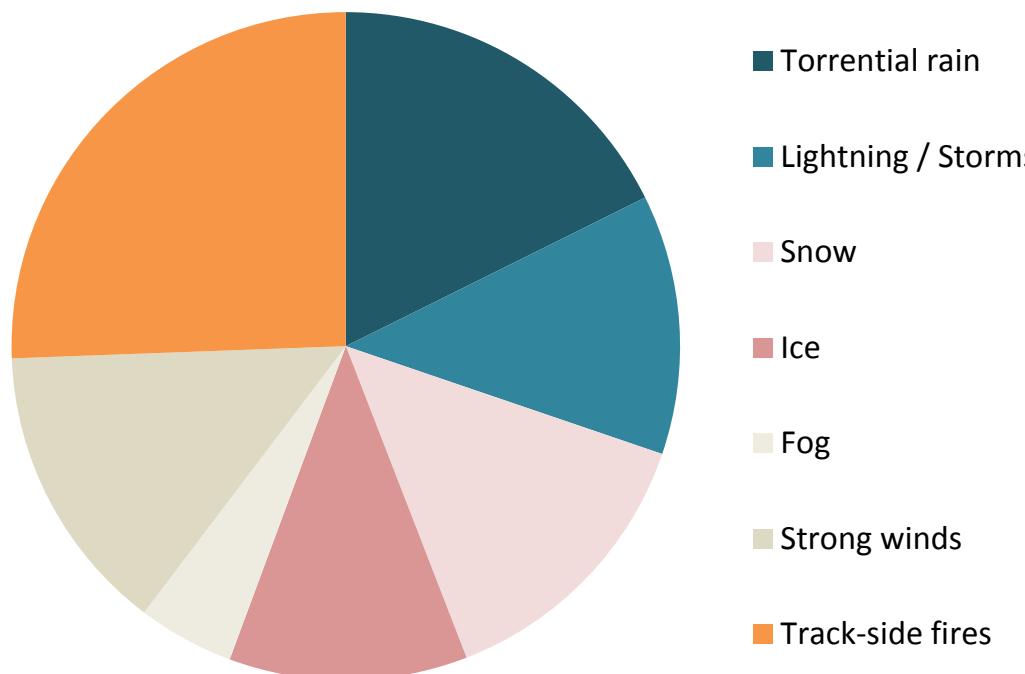
High-speed network



- Torrential rain
- Lightning / Storms
- Snow
- Ice
- Fog
- Strong winds
- Track-side fires

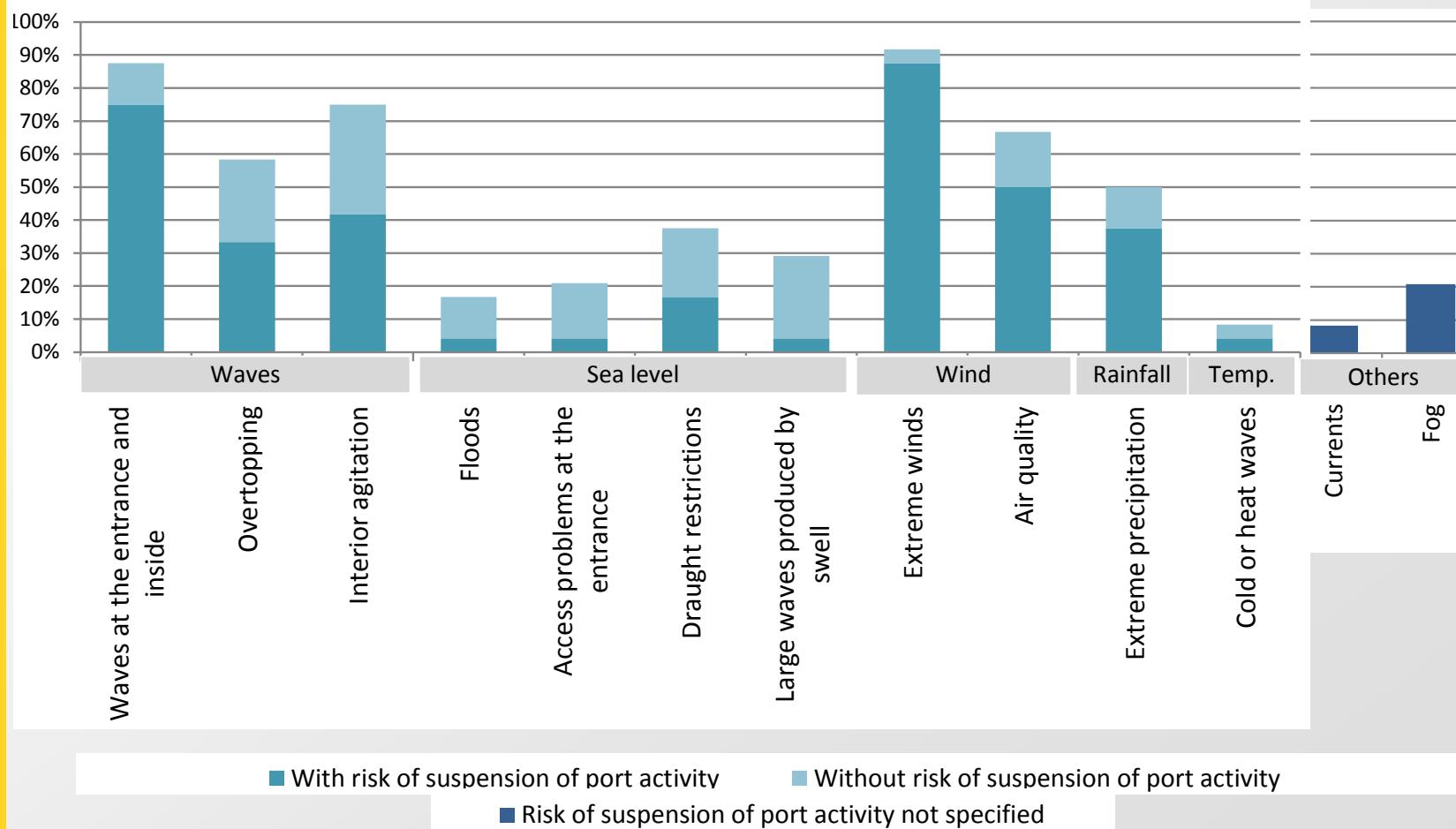
Current vulnerability of the rail network to climate

Average annual distribution of weather-related incidents affecting train movement recorded by Renfe Operadora (data from 2010-2011)



Current vulnerability of the port network to climate

Percentage of Port Authorities with port operation problems due to climatic variables



Current vulnerability of the airport network to climate

Number of level-1 incidents by airport and type
(Period analysed: 2007-2011 - Sample: 119 incidents)

