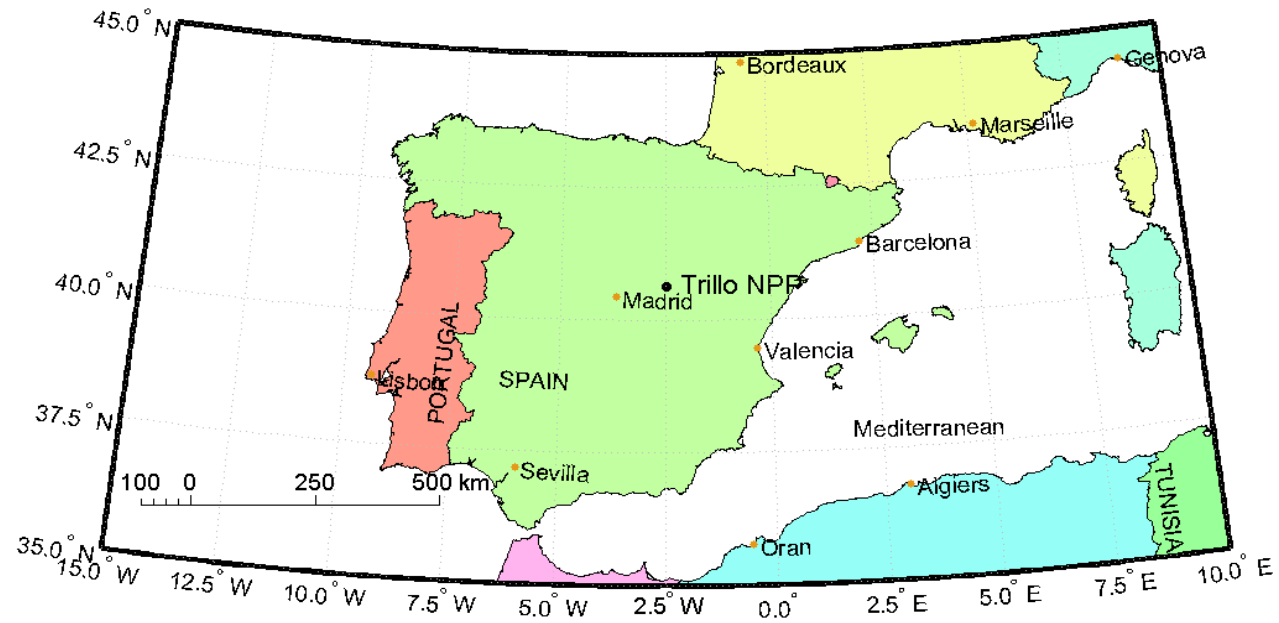


# Modelling mid-range radionuclide dispersion and deposition from an hypothetical NPP accident: Trillo NPP scenario



EMRAS-II project

# Localization



# Trillo NPP



# Trillo NPP

- Position
  - 40°42'4" N
  - 2°37'23" W
- Started operation in 1987; 1043 MW; PWR
- Distances to nearest urban areas
  - Guadalajara (81200 hab): 46 km
  - Madrid (metropolitan area): 70 km

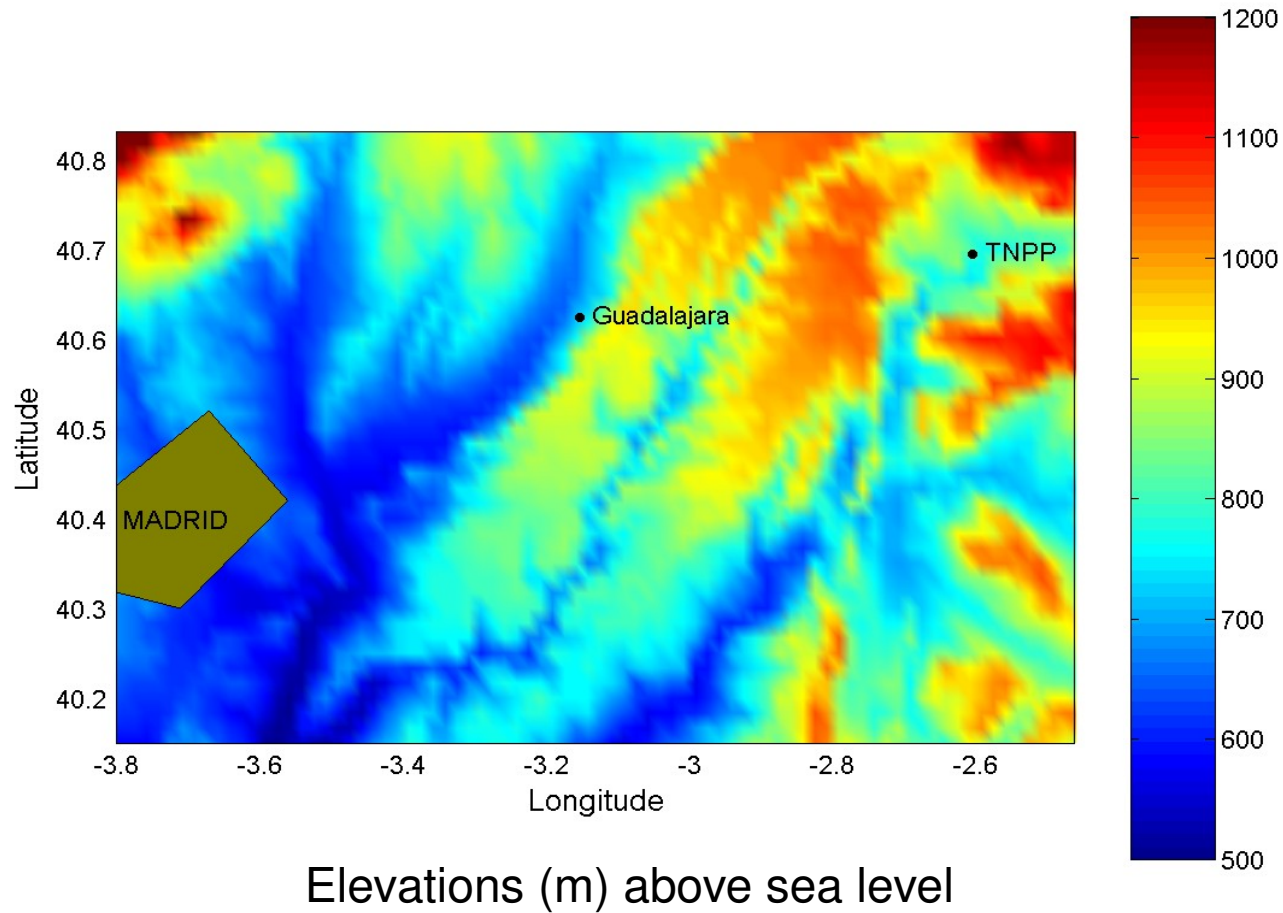
# Scenario objective

- Based on a hypothetical release of radioactivity from a NPP
- It is intended to provide an opportunity to test model predictions for mid-term atmospheric dispersion:
  - Ground deposition
  - Air time-integrated concentrations
  - Contamination time series at selected locations

# Input data

- Geographic data
  - Topography
  - Points of interest
- Meteorological data
  - Wind fields
- Release data
  - Radionuclides released
  - Duration and magnitude of releases

# Topography - NOAA Geodas database 1 min resolution



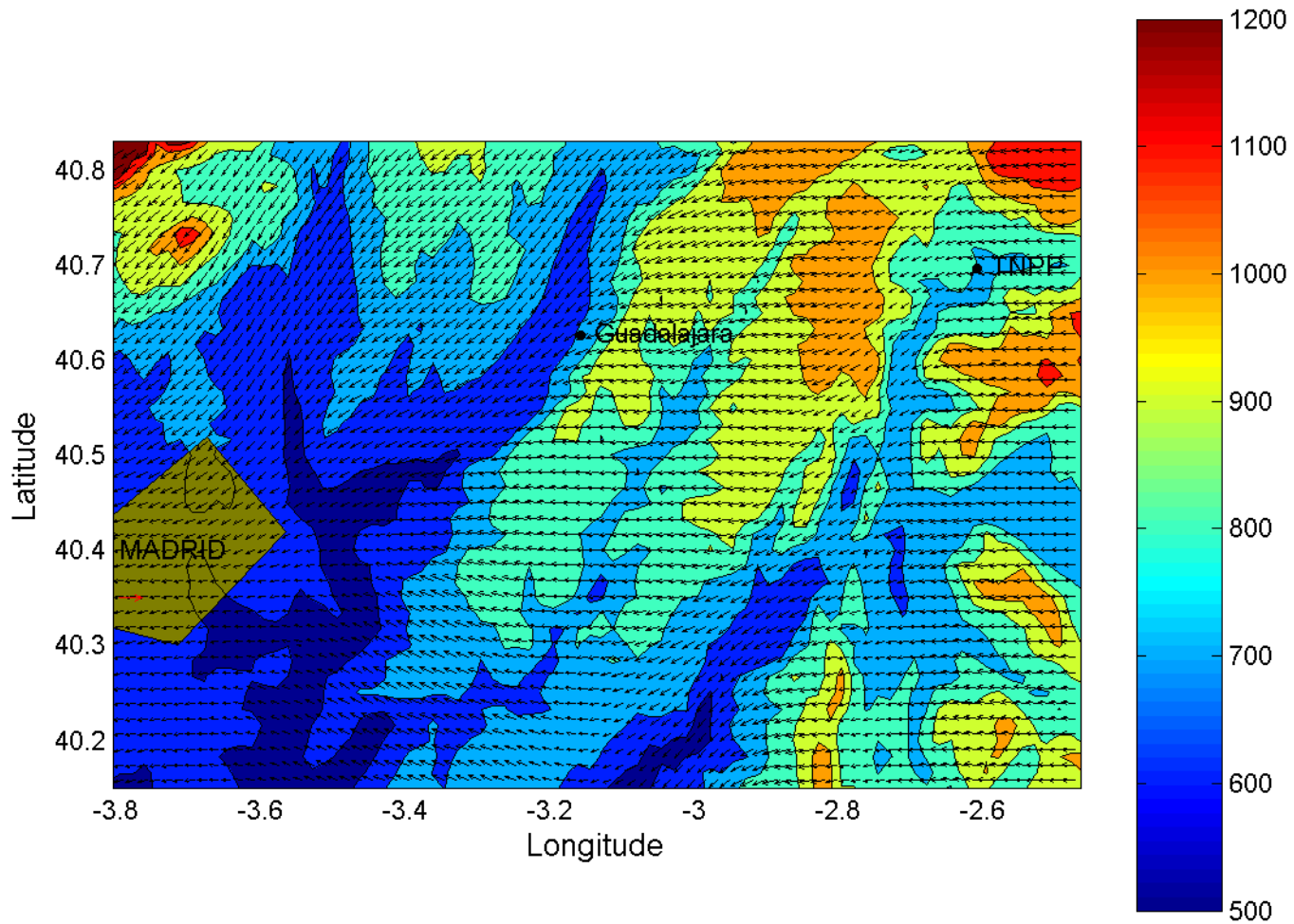
# Meteorological data

	Stable	Neutral stability
BLH (m)	1000	1500
Geostrophic wind (m/s)	3,0	6,0
Direction (deg)	140	140
Atmospheric lapse rate (K/m)	0,006	0,009
Stability class	E	D
File name	trillostuv.dat	trillonsuv.dat

Files contain wind fields 10 m above the ground calculated with WINMOD model in the format: i,j,x,y,u,v



# Wind field 10 m above the ground. Stable atmosphere



Wind field calculated with WINMOD model (Univ of North Wales, UK)

# Release data

Steam generator tube rupture scenario developed by IRSN

- Two radionuclides:  $^{137}\text{Cs}$  and  $^{131}\text{I}$
- Release duration: 1 hour
- Variable release rate for both radionuclides
- Effective release height: 50 m
- Simulation time: 10 hours

# Simulation endpoints

- Contour map of deposited activity ( $\text{Bq/m}^2$ ) on the ground at the end of the simulation.
- Contour map of time integrated air activity concentration - ( $\text{Bq/m}^3$ ) $\times$ min- at ground level (averaged value up to 50 m over the ground).
- Time series of activity concentration in air - $\text{Bq/m}^3$ - (averaged value from ground level to 50 m) at three points: Guadalajara, downtown Madrid and an intermediate point between TNPP and Guadalajara.

# Files provided with scenario

- trillo.xyz: topography
- trillostuv.dat: wind field for stable atmosphere
- trillionsuv.dat: wind field for neutral atmosphere
- scenarios\_EMRAS2.pdf: accident description
- releases.xls: release data