

“Portuguese Lightning Detection Network” (2003-2006)

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Lightning Network



Lightning Network Portugal

4 IMPACT 141T - ESP – Vaisala

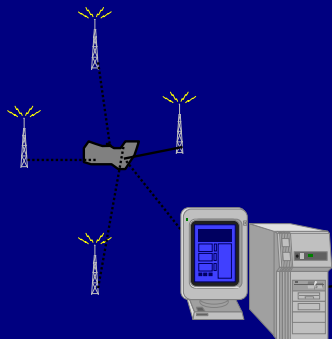
- Braga
- Castelo Branco
- Alverca (Lisboa)
- Olhão (Faro)



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Lightning Applications

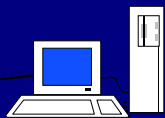
Localization Processor



**LP2000
(Vaisala)**

Detection Network

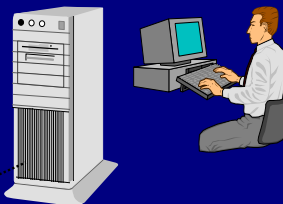
CATS (Météorage)



JOBS user's (Météorage)



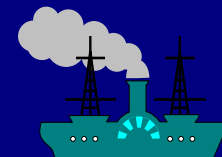
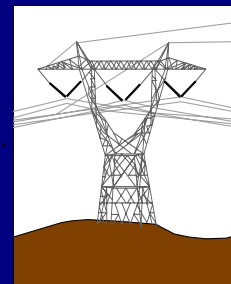
Applications



Local User



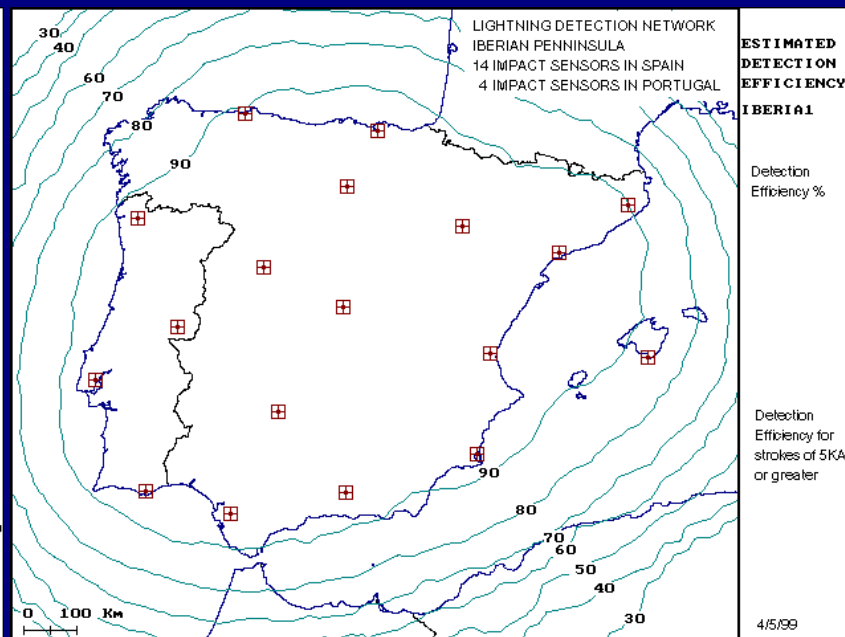
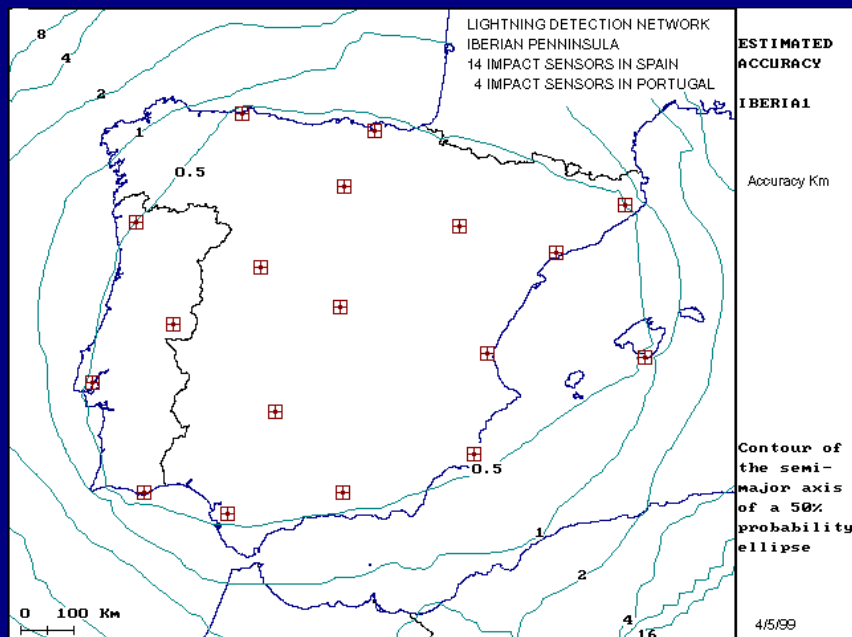
Remote user



Applications: Meteorology, Aeronautics, Agriculture, Insurance Companies, Hydrology, Electricity Companies, Oil Companies, Telecommunications, etc.

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Lightning Accuracy and Detection Efficiency

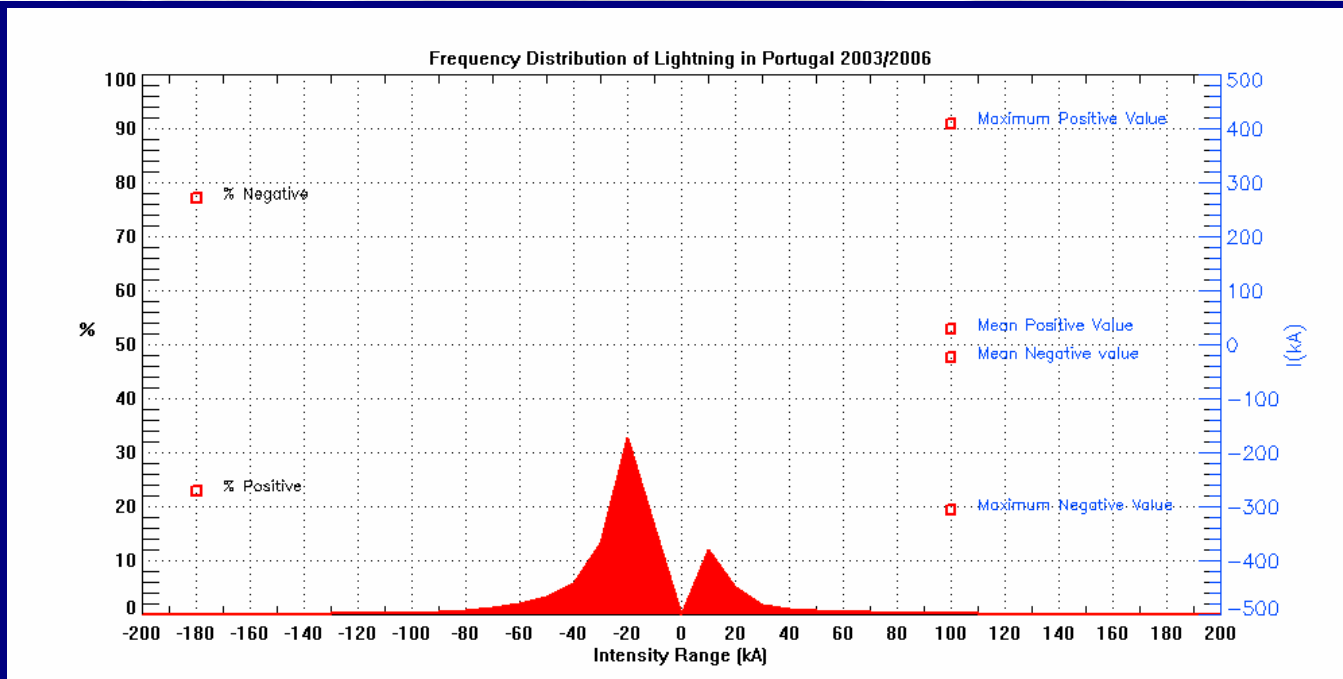


- Lightning accuracy from 0.5 to 1 km.
- Lightning detection efficiency superior to 90%.

Note: most system failures due to electric problems, sensor and communication failures (<5%).

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Frequency Distribution 2003/2006

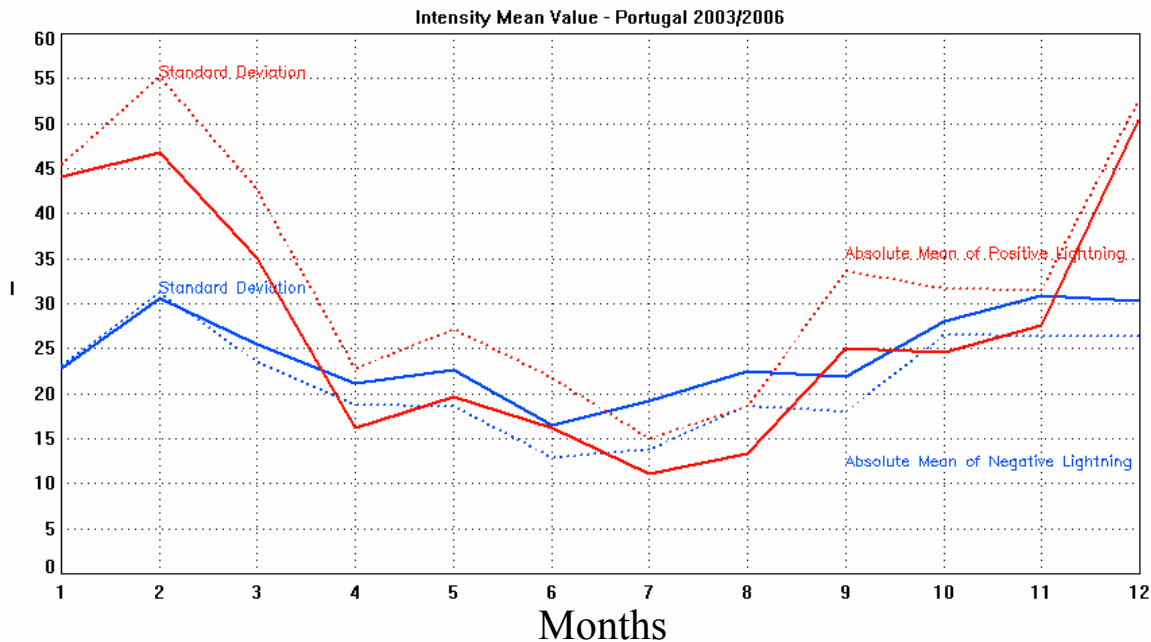


Lightning frequency distribution over Portugal in classes of 10 kA, from -200 to 200 kA:

- Maximum occurrence between (-20,-10) kA » 32.9 %
- **Positive** lightning » 22.9 % , Maximum value = 409.5 kA , Mean value = 27.5 kA
- **Negative** lightning » 77.1 % , Minimum value = -305.6 kA , Mean value = -24.3 kA
- Lightning accuracy (< 1 km) = 51.9 % and (<10 km) = 82.5 %

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Intensity 2003/2006

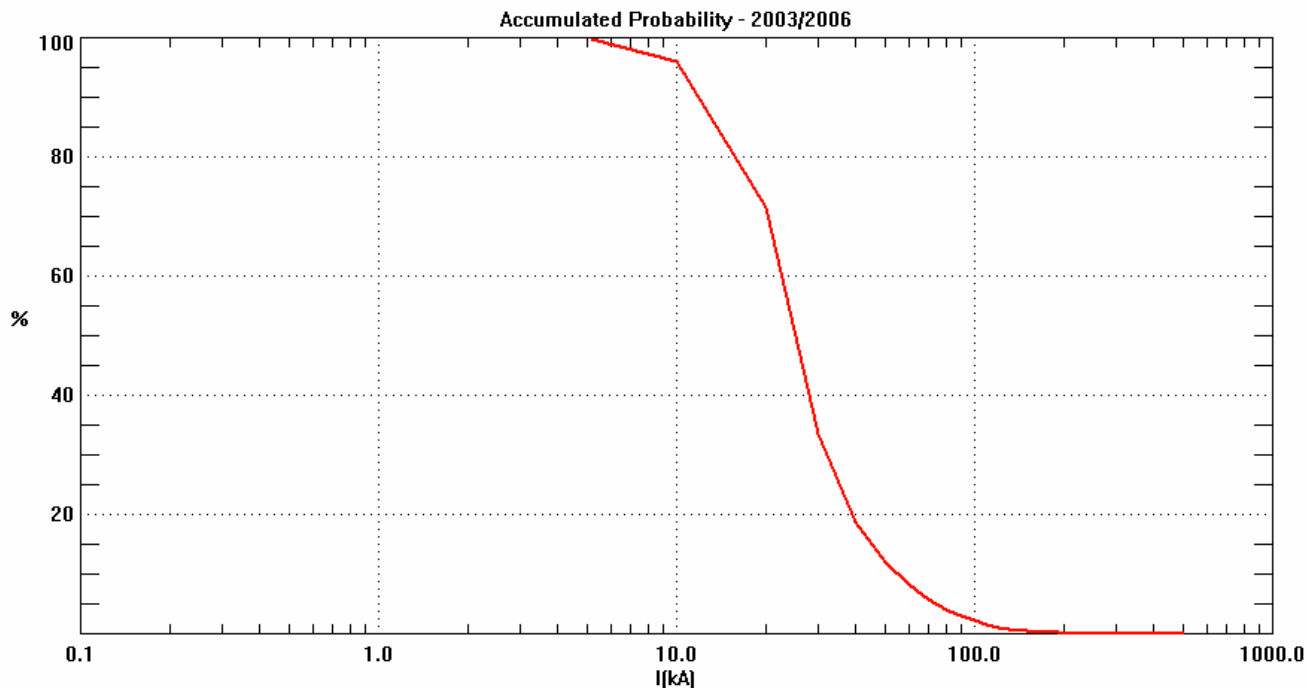


Lightning intensity mean value distribution over Portugal per month for 2003/2006:

- Maximum intensity mean value of **positive** lightning at February » 46.7 ± 55.3 kA
- Minimum intensity mean value of **positive** lightning at July » 11.0 ± 15.0 kA
- Maximum intensity absolute mean value of **negative** lightning at November » 30.9 ± 26.4 kA
- Minimum intensity absolute mean value of **negative** lightning at June » 16.5 ± 12.9 kA

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Accumulate Probability Distribution

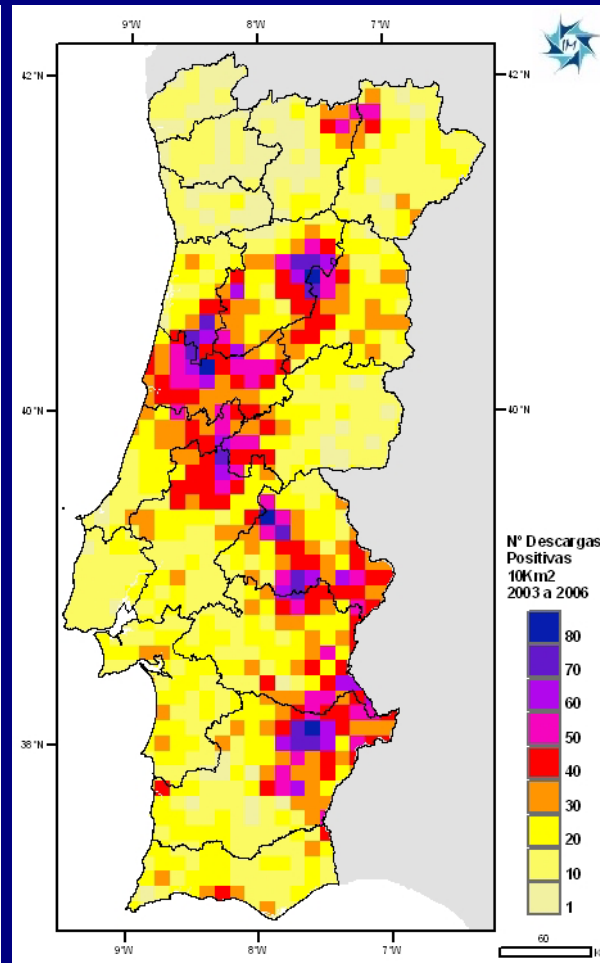
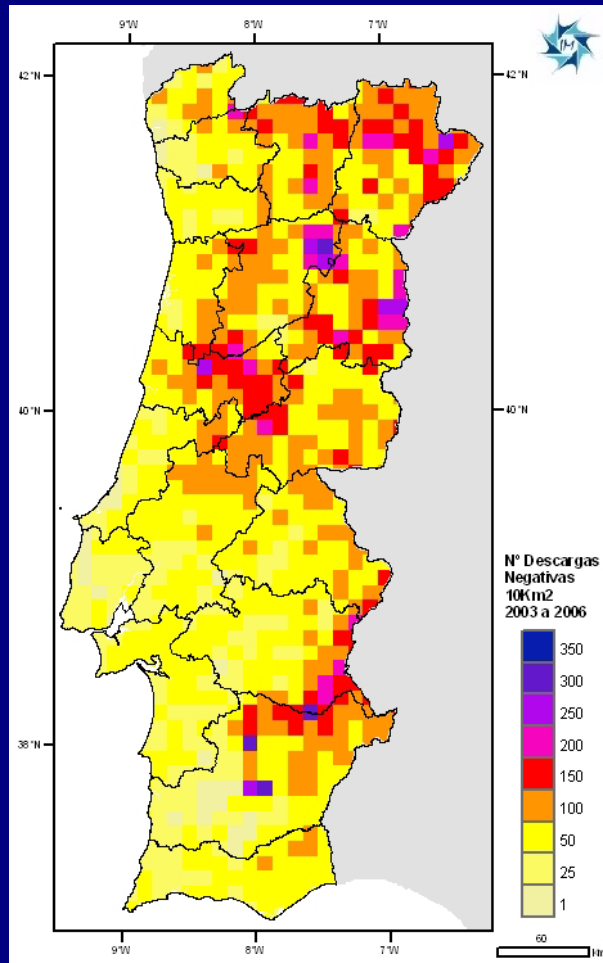


Represents the sum of the accumulated frequencies occurrences over classes » (0-1), (1-3), (3-5), (5-10) and successively of 10 kA classes with a range of (490-500) kA

- Classes from (20-30) to (490-500) represents a probability of 33.6%
- Classes from (0-1) to (10-20) represents a probability of 66.4 %

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Spatial Distribution of Negative and Positive Lightning Occurrence



Negative lightning occurrence
(10x10 km²):

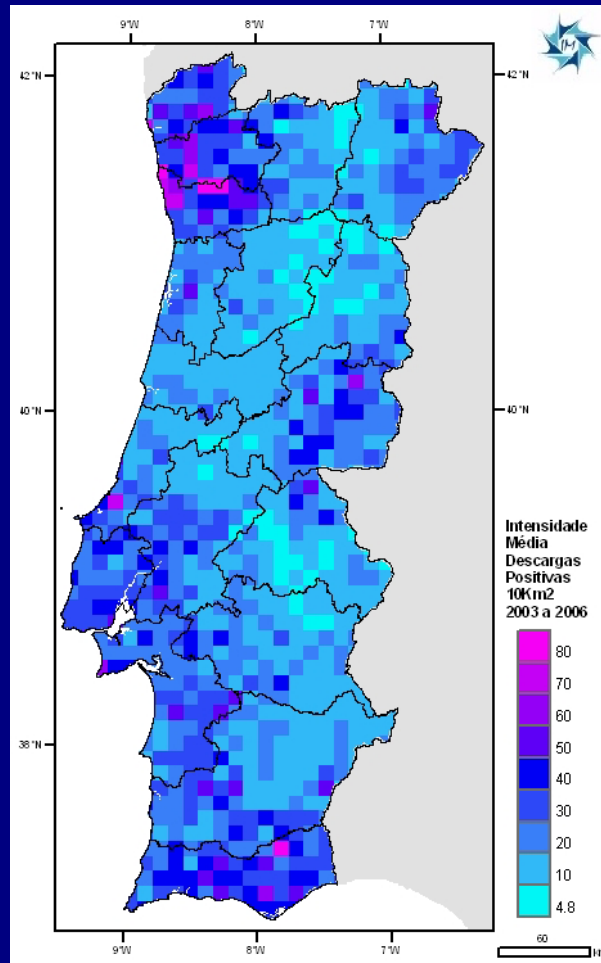
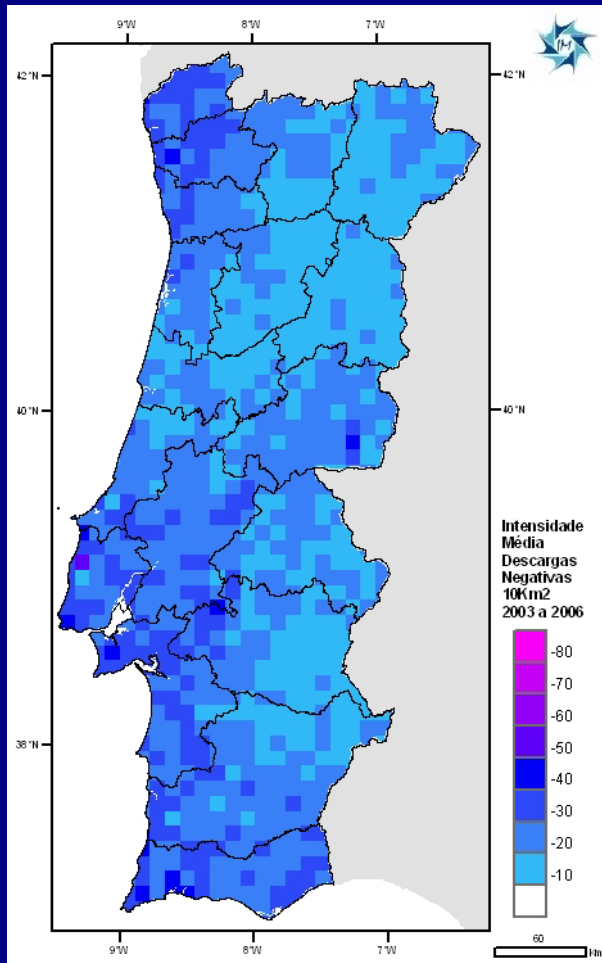
Maximum value = 350 flashes

Positive lightning occurrence
(10x10 km²):

Maximum value = 80 flashes

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Spatial Distribution of Negative and Positive Lightning Intensity



Negative lightning intensity (10x10 km²):

Maximum mean value = -50 kA

Positive lightning intensity (10x10 km²):

Maximum mean value = 80 kA

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Thank you!

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