EUCLID
European Cooperation for Lightning Detection

EUCLID: 15 years of high resolution lightning observations over Europe

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What is ?

EUCLID
European Cooperation for Lightning Detection

- EUCLID (EUropean Cooperation for LIghtning Detection) is a European cooperation among national LLS.
- Started in 2001 with 6 countries it has grown over the years to 27 countries nowadays.
- A total of 149 Vaisala's technology sensors (2014/12) are concentrated as one seamless network.
  - LS700X: **101**
  - IMPACT: **41**
  - LPATS: **7**

Missions and goals

EUCLID
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- Establish a united network covering the greater part of the European continent on a cooperation basis.
- Benefit the members by delivering an extended lightning data coverage to neighboring regions for their services or internal usage.
- Have a common European forum for discussion, maintenance, technical solutions, and network optimization.
- Provide services on wide areas (multinational) to different customers.
- Support research and scientific projects that will lead directly to new applications of lightning data.

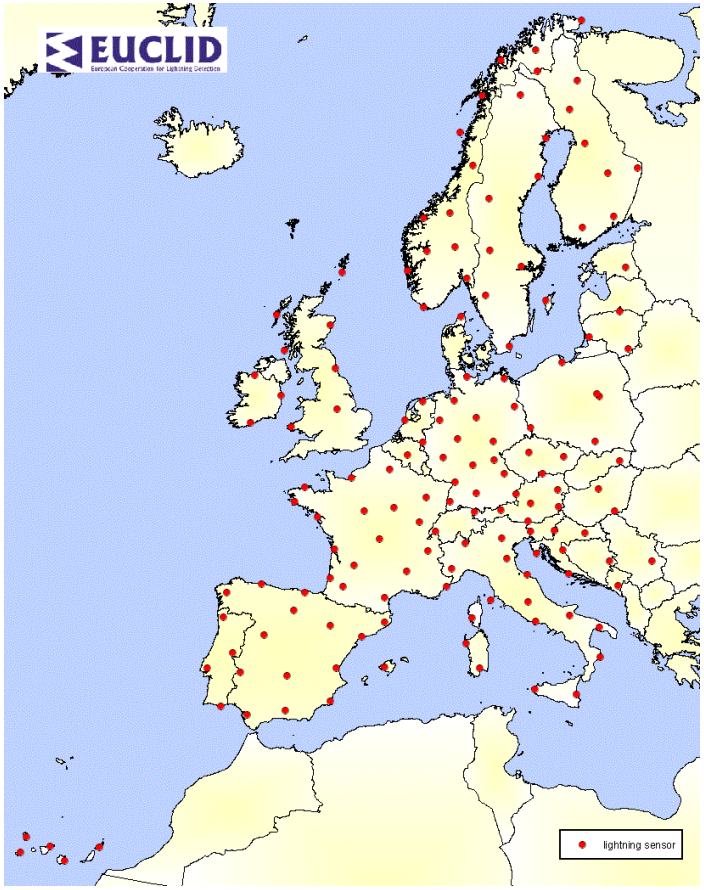
Technology

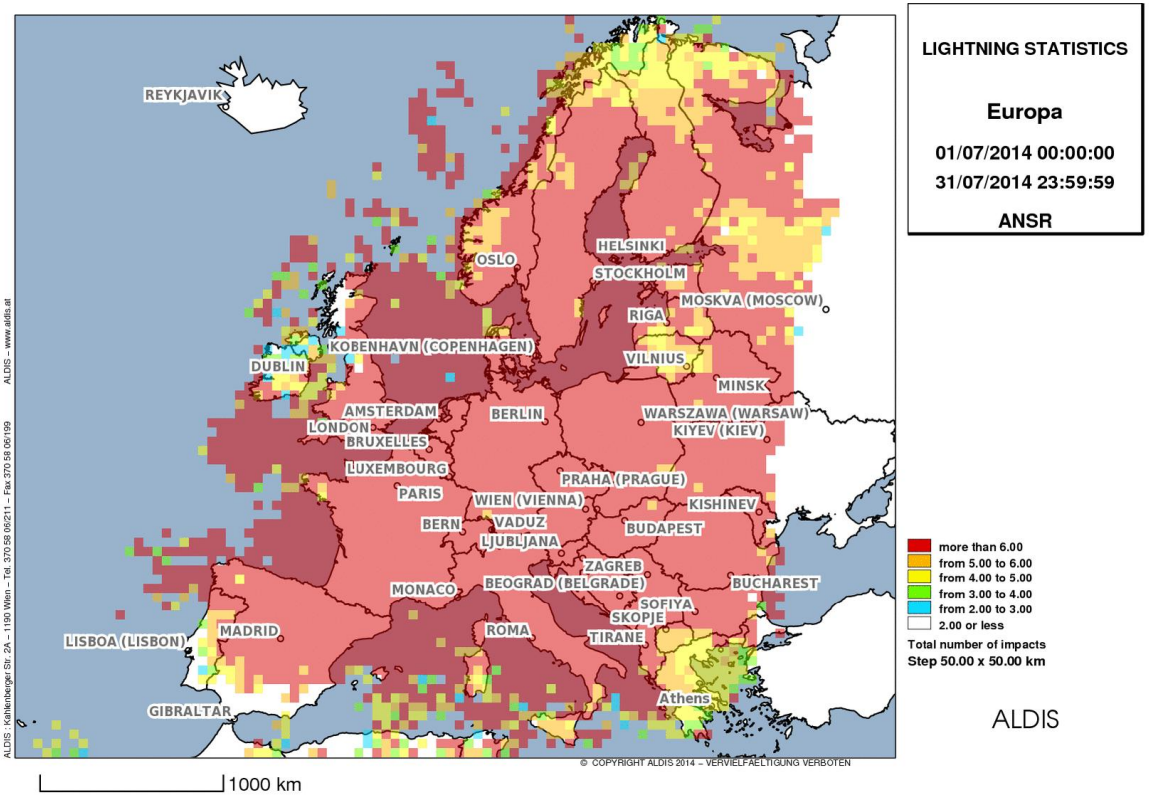
- Each sensor detects the electromagnetic signal emitted by the lightning return stroke in the LF bandwidth:
  - Sensors are time synchronized using GPS Satellite signals
  - Sensors measures angle bearing, time of arrival and waveform parameters (rise time, decay time and peak)
    - CG return strokes
    - CC vertical discharges
  - Send data in real time simultaneously to two redundant lightning analyzers

- Each lightning analyzer uses the a combined TOA and MDF technology (IMPACT)
  - Corrects angle and time measurements from systematical errors
  - Computes the stroke parameters (time, position, peak current intensity, polarity)
  - Groups consistent return strokes in flashes (based on distance and time)
  - Estimate the theoretical location error for each strokes (SMA and CHI^2)

- The resulting data are sent to the Euclid service operational center.
  - This leads to a complete picture of lightning activity in real time.
  - All lightning data collected is archived as well for post-storm analysis.

Sensors and coverage





www.euclid.org

Quality control

- The European LLS is permanently monitored by ALDIS (Austria)
  - Real time monitoring (in addition to the national LLS operators)
  - Data quality control with monthly report
  - Angle and time measurement corrections
    - Used by EUCLID and shared with all the national LLS operators.
  - Overall performances control(LA and DE)
    - Gaisberg Tower
    - Mobile High speed video and E-Field measurements

- The services platform is permanently monitored by Météorage (France)
  - Real time monitoring of the services
  - Consistency checks on the lightning database
  - Engineer on duty 24h/24 – 7d/7

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EUCLID contribute to several science projects:

- EUROSPRITE campaigns (since 2004)
- HyMeX (HYdrological cycle in Mediterranean EXperiment)
- Estofex (European Storm Forecast Experiment)
- Several EPFL research projects
- Several ZAMG research projects (e.g. 3pclim, HAREN, EDHIT)

Conclusion

EUCLID
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- EUCLID is a European cooperation among 27 countries covering the almost complete EUROPE started 15 years ago and constantly improving.

- EUCLID provides homogenous high resolution data permanently scientifically controlled against ground truth data.

- EUCLID is the historical lightning data provider whose data have been used in quite a number of scientific projects