Radarmeteo

Company profile

Radarmeteo s.r.l.

Italian-based company specialized in providing professional weather services

Team includes about 15 people specialized in Physics, Atmospheric Physics, Data Science. Forestry and Agricultural Sciences, Environmental Engineering

Operative only in the B2B market

ISO 9001:2015 certified Company for Provision of professional weather services

ISO 9001
BUREAU VERITAS
Certification

Mission

1) Professional services

2) DSS platforms

3) Applications

4) Data

for the management and optimization of activities affected by meteorological phenomena and climate change

Industries

UTILITY

Weather data visualization applications

Provision of near real-time and forecast data for early warning purposes (e.g. rain, lightning)

24/7 operational weather support

LAND RECLAMATION AUTHORITY

Weather data visualization applications

24/7 operational weather support

Ex-post analysis with historical data

TRANSPORT & ROAD

24/7 operational weather support

Weather data visualization applications

Ex-post analysis with historical data

OIL & GAS, MARITIME

24/7 operational weather support

Probabilistic long-term forecasts (ensemble methodology)

Alert and notifications of lightning and severe weather

Industries

AIRPORT

24/7 operational weather support

Alert and notifications of lightning and severe weather

Weather data visualization applications

SMART AGRICULTURE

Weather data integration (historical, real-time, forecast) for DSS

Consultancy for installation and integration of IoT sensors

INSURANCE

Supply of historical data for risk assessment and policy pricing

Development of risk index

Supply of on-demand reports to operative groups

CIVIL PROTECTION

Weather data visualization applications

24/7 operational weather support

Industries

ENERGY

Integration of historical weather data for climatological analysis

Integration of real-time and forecast data for plant producibility

Alerts and notifications on severe events to minimize impact on infrastructures

RETAIL

Integration of forecast data to provide purchase proposals in line with weather conditions (website, e-commerce)

Customization of in-store messages by adapting the contents according to real-time weather conditions

Cross-analysis of weather-sales data to optimize marketing campaigns

Predictive support for demand analysis

Solutions

Support services

RoadCast®

RailCast®

SeaCast®

AirportCast®

Hydrometeorological alert

Medium-term trend

Meteotrigger®

Weather networks

Applications

RadarCast®

GisMeteotrigger®

RainGis®

SnowGis®

RainCast®

Alert-Ex-Post®

meteoleaks®

DSS

MeteoCast®

Lightning monitoring

A.L.A.S. - Airport Lightning

Alert System®

W.I.S.E. – Wastewater Integrated System Enhancement®

Hypermeteo

Historical reanalysis data

Near real-time data

Forecast data

Services

References

e-distribuzione

GSE Gestore Servizi Energetici

e-geos UNA SOCIETÀ ASI/TELESPAZIO

a2a Ciclo Idrico

IRETI

unareti

GRUPPO HERA

Terna

Adriatic LNG

EDISON Exploration & Production

Allianz

GENERALI

CATTOLICA SOCIETA' CATTOLICA DI ASSICURAZIONE DAL 1896

UnipolSai ASSICURAZIONI

GRUPPO ITAS ASSICURAZIONI

ISMEA Istituto di servizi per il mercato agricolo alimentare

SOMPO

RFI RETE FERROVIARIA ITALIANA

anas

SIAS

Aeroporti di Roma

Cagliari Airport SOGAER

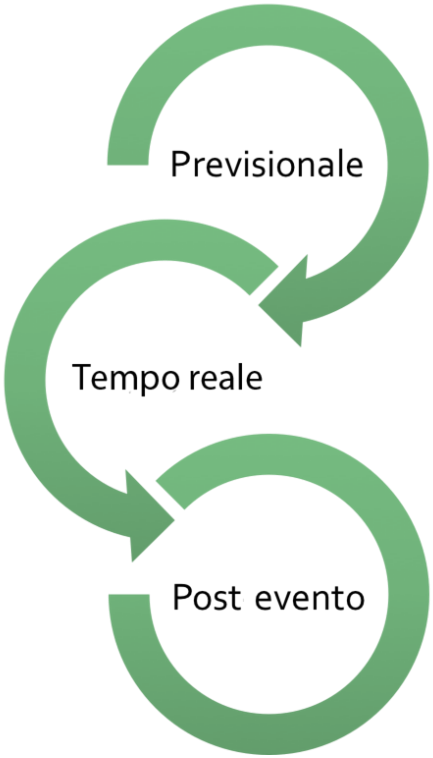
Comune di Milano

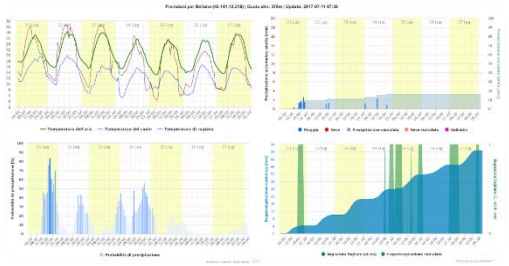
TORINO METROPOLI

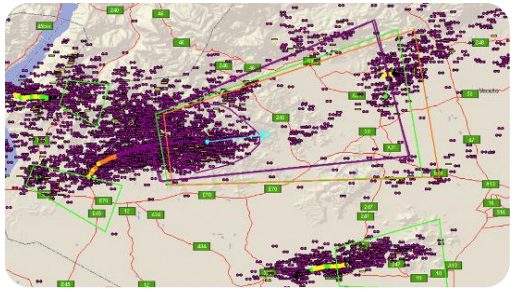
The Floating Piers

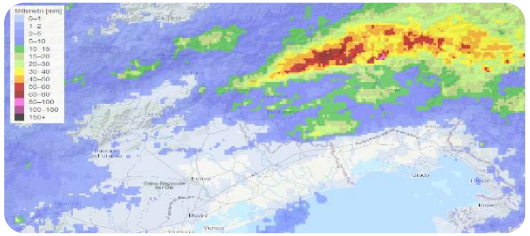
Overview

Our services cover all meteorological needs as the forecast phase, the continuous and precise monitoring in real-time and the support and consultation regarding the ex-post management







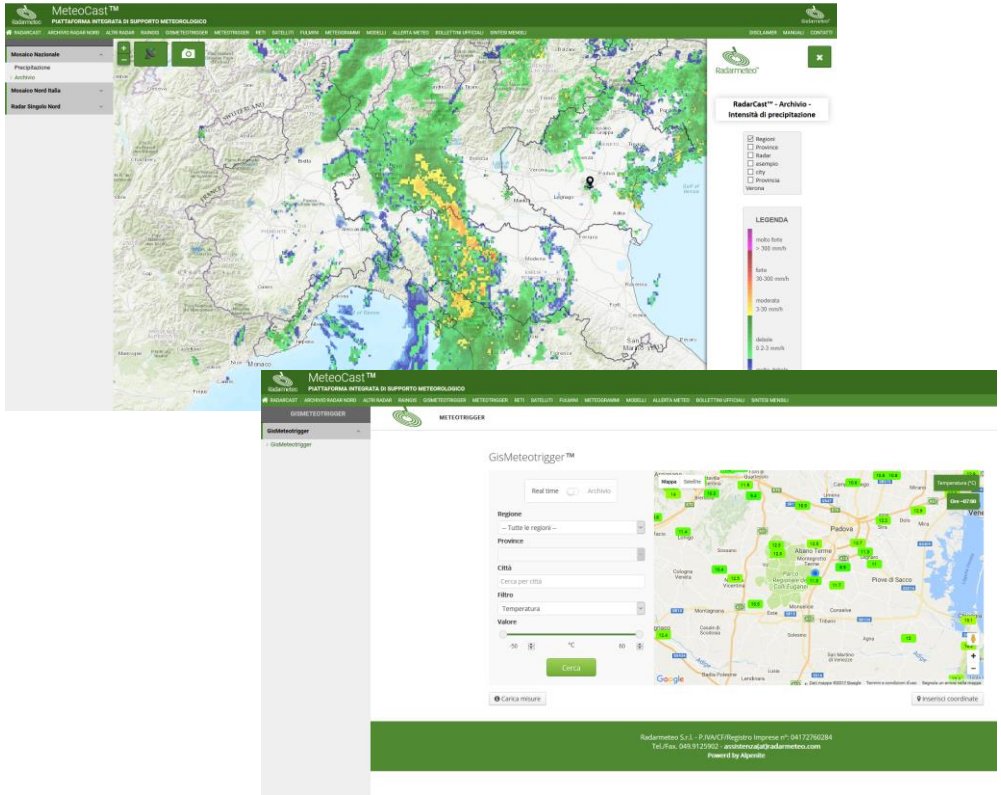


Meteorological Decision Support System

MeteoCast®

The platform, accessible via a web-app, collects the whole available meteorological information:

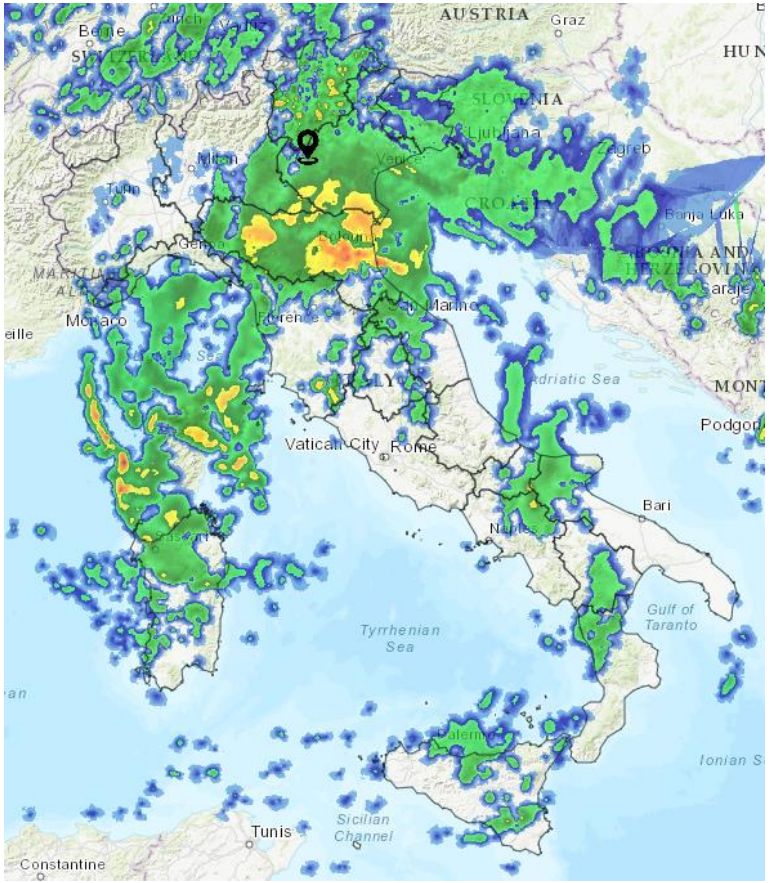
- RadarCast®
- RainGis® /SnowGis®
- GisMeteotrigger®
- Meteotrigger®
- Lightning and thunderstorm monitoring
- Nowcasting and forecasting bulletins
- Forecast maps and graphs
- Satellite images



Italian radar mosaic

RadarCast®

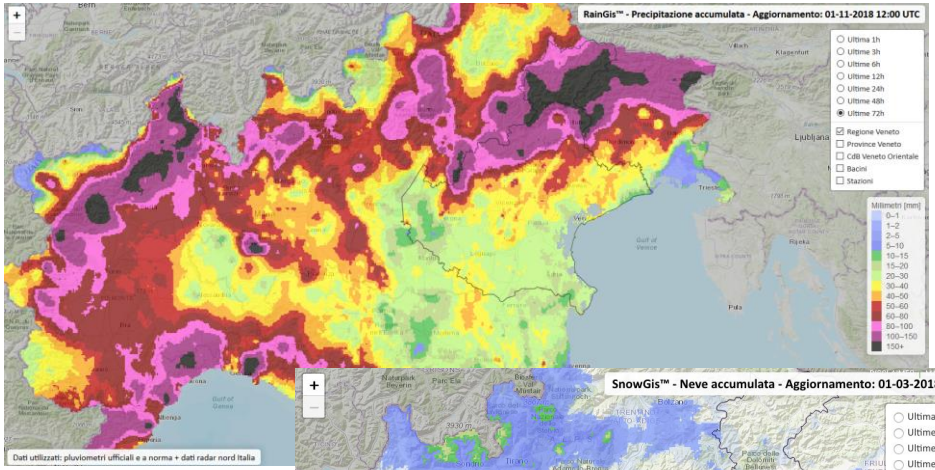
- Includes approximately 40 italian and near countries' weather radars
- 1 km data spatial resolution
- Interactive visualization of precipitation in real time
- Interactive visualization of precipitation type (rain, snow, hail…)
- Nowcasting feature (high precision short-term forecast)
- Historical archive

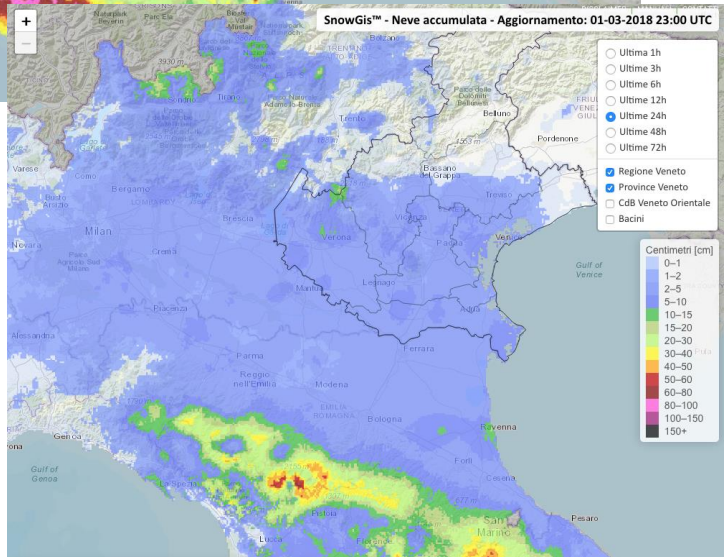


Real-time & historical accumulated precipitation maps

RainGis® & SnowGis®

- Accumulated precipitation processed by integrating radar data with weather stations data.
- Visualization of rainfall accumulation on an interactive GIS system.
- Integration of Client-owned data for improved accuracy and quality information.

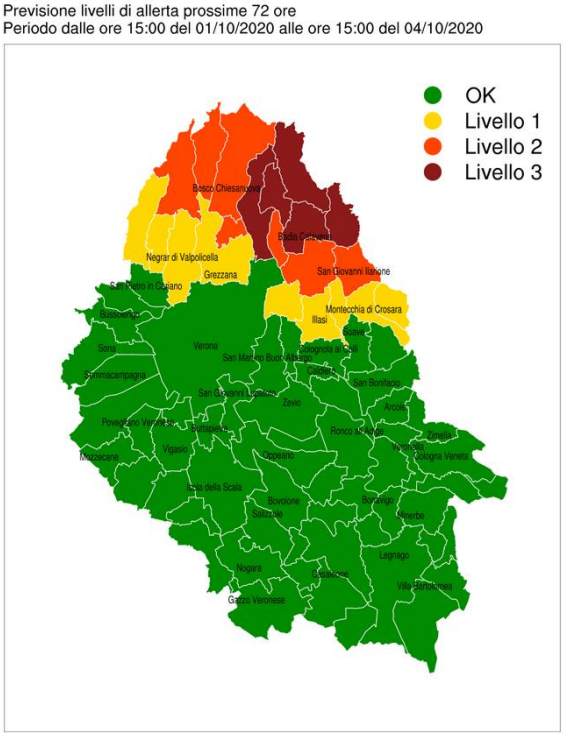


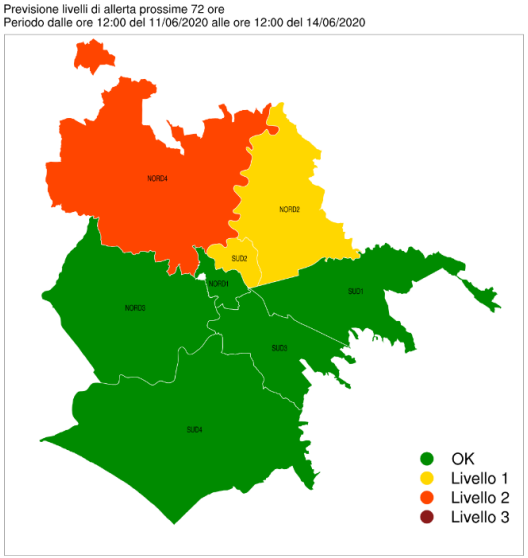


Accurate prediction of precipitation accumulations in the following 72 hours

RainCast®

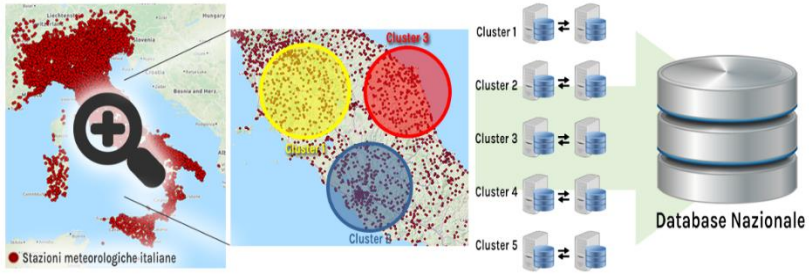
- Integration of different forecasting methodologies (nowcasting and models) depending on the time horizon of the forecast;
- Hourly updated;
- Alert thresholds contextualized to the local climatology (e.g. return times) and defined on different time windows of accumulation (1, 3, 6, 12, 24, 48 and 72 hours).

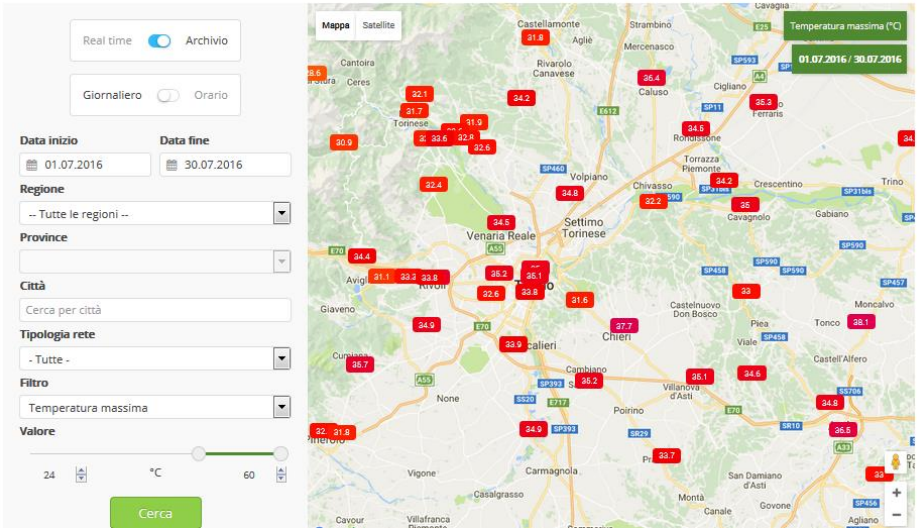




GisMeteotrigger®

- Data visualization tool of the database of certified, official and WMO compliant meteorological data
- Collects all available meteorological data continuously
- Easily provides both real time and historical data
- Geolocates the user and shows data related to nearby weather stations
- Recently integrated with historical lightning data

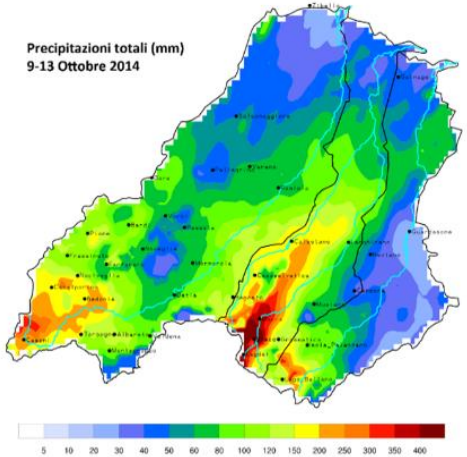


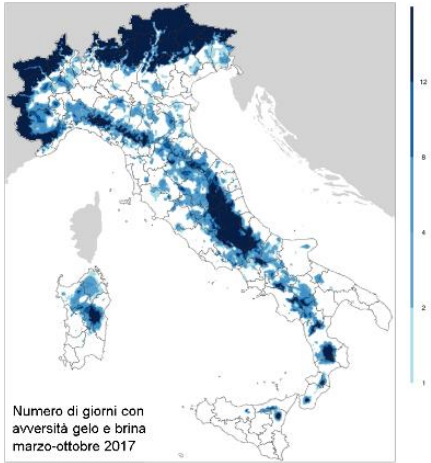


Meteotrigger® & Alert Ex-Post®

- Services for the supply of reports for the verification of severe weather conditions described in insurance contracts, starting from certified, official data and in accordance with WMO
- They also offer support in institutional communication, in relations with media and in any legal disputes

Località	Accumulo precipitativo in 3h			Info superamento soglia	
	Massimo	*Minimo*	*Media*	*Porzione comunale*	*Zona*
Soave	52 mm	35 mm	45 mm	75 %	Centro-Sud
Monteforte d. A.	41 mm	34 mm	37 mm	6 %	Sud
San Bonifacio	49 mm	40 mm	43 mm	100 %	-
Arcole	43 mm	37 mm	40 mm	47 %	Nord-Est
Colognola	53 mm	35 mm	43 mm	57 %	Est
Caldiero	47 mm	36 mm	41 mm	50 %	Est
Illasi	45 mm	30 mm	34 mm	8 %	Sud-Est



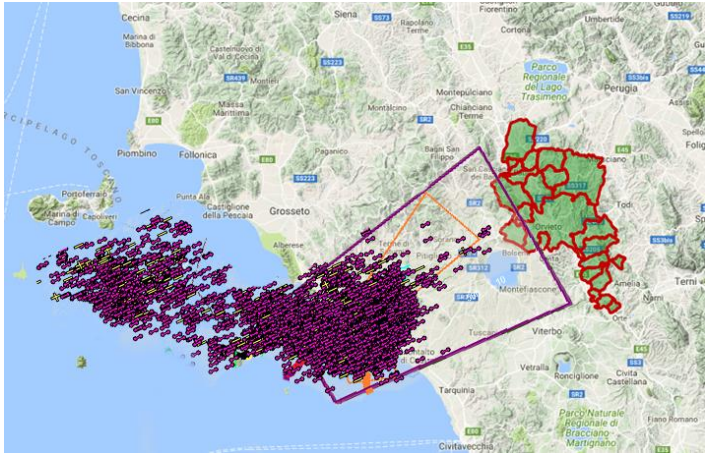


Precision monitoring network and software

Lightnings and thunderstorms

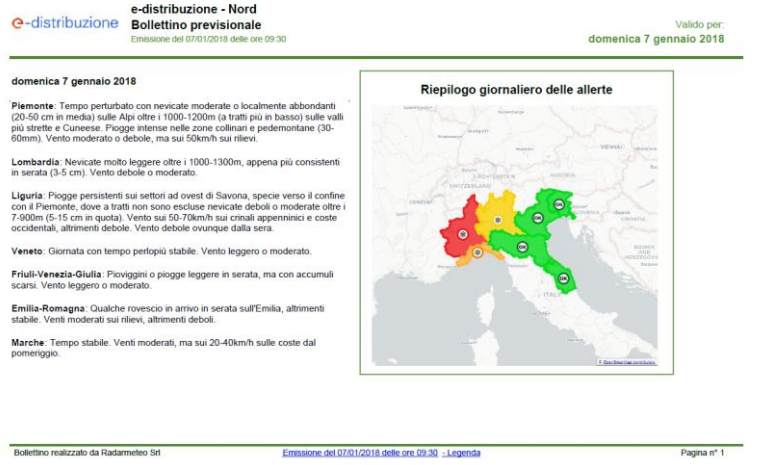
Network for high-precision thunderstorm tracking, with indication of their position, intensity and direction of movement

- High detection efficiency: exceeding 98% of total lightning and high accuracy: about 200m
- Tracking each storm with:
  - Indication of the areas affected by the storm in the next hour
  - Indication of the position, intensity and direction of movement
- Alert and notification system



24/7/365 weather support service

- Weather forecast bulletins from 72h ahead the occurrence of severe weather phenomena, supported by interactive maps with territorial focus and highlighting the areas on which the severe weather is expected.
- The bulletin is sent via email and is available on a dedicated web-app.
- Continuous support to the operating room, operators, decision makers in the delicate phases of severe weather, in particular to correctly inform on the intensity and evolution of the meteorological situation



e-distribuzione

e-distribuzione - Nord
Bollettino previsionale
Emissione del 07/01/2018 delle ore 09:30

Valido per:
domenica 7 gennaio 2018

domenica 7 gennaio 2018

Piemonte: Tempo perturbato con nevicate moderate o localmente abbondanti (20-50 cm in media) sulle Alpi oltre i 1000-1200m (a tratti più in basso) sulle valli più strette e Cuneese. Piogge intense nelle zone collinari e pedemontane (30-60mm). Vento moderato o debole, ma sui 50km/h sui rilievi.

Lombardia: Nevicate molto leggere oltre i 1000-1300m, appena più consistenti in serata (3-5 cm). Vento debole o moderato.

Liguria: Piogge persistenti sui settori ad ovest di Savona, specie verso il confine con il Piemonte, dove a tratti non sono escluse nevicate deboli o moderate oltre i 7-900m (5-15 cm in quota). Vento sui 50-70km/h sui crinali appenninici e coste occidentali, altrimenti debole. Vento debole ovunque dalla sera.

Veneto: Giornata con tempo perlopiù stabile. Vento leggero o moderato.

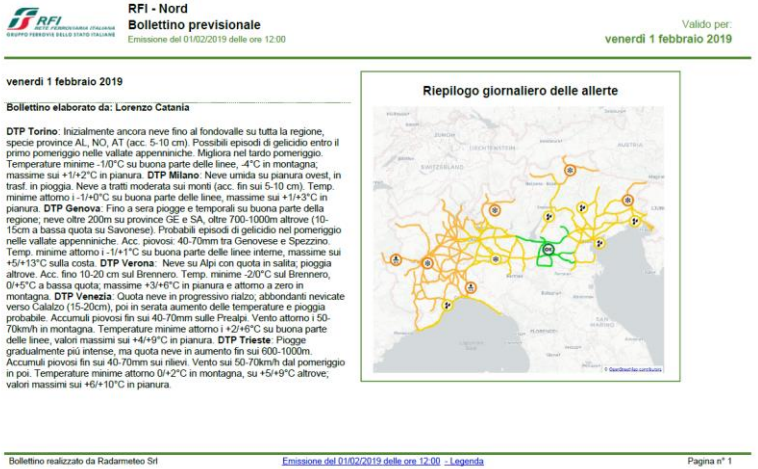
Friuli-Venezia-Giulia: Pioviggini o piogge leggere in serata, ma con accumuli scarsi. Vento leggero o moderato.

Emilia-Romagna: Qualche rovescio in arrivo in serata sull'Emilia, altrimenti stabile. Venti moderati sui rilievi, altrimenti deboli.

Marche: Tempo stabile. Venti moderati, ma sui 20-40km/h sulle coste dal pomeriggio.

Riepilogo giornaliero delle allerte

Bollettino realizzato da Radarmeteo Srl — Emissione del 07/01/2018 delle ore 09:30 - Legenda — Pagina n° 1



RFI

RFI - Nord
Bollettino previsionale
Emissione del 01/02/2019 delle ore 12:00

Valido per:
venerdì 1 febbraio 2019

venerdì 1 febbraio 2019

Bollettino elaborato da: Lorenzo Catania

DTP Torino: Inizialmente ancora neve fino al fondovalle su tutta la regione, specie province AL, NO, AT (acc. 5-10 cm). Possibili episodi di gelicidio entro il primo pomeriggio nelle vallate appenniniche. Migliora nel tardo pomeriggio. Temperature minime -1/0°C su buona parte delle linee, -4°C in montagna, massime sui +1/+2°C in pianura. **DTP Milano**: Neve umida su pianura ovest, in trasf. in pioggia. Neve a tratti moderata sui monti (acc. fin sui 5-10 cm). Temp. minime attorno i -1/+0°C su buona parte delle linee, massime sui +1/+3°C in pianura. **DTP Genova**: Fino a sera piogge e temporali su buona parte della regione; neve oltre 200m su province GE e SA, oltre 700-1000m altrove (10-15cm a bassa quota su Savonese). Probabili episodi di gelicidio nel pomeriggio nelle vallate appenniniche. Acc. piovosi: 40-70mm tra Genovese e Spezzino. Temp. minime attorno i -1/+1°C su buona parte delle linee interne, massime sui +5/+13°C sulla costa. **DTP Verona**: Neve su Alpi con quota in salita; pioggia altrove. Acc. fino 10-20 cm sul Brennero. Temp. minime -2/0°C sul Brennero, 0/+5°C a bassa quota; massime +3/+6°C in pianura e attorno a zero in montagna. **DTP Venezia**: Quota neve in progressivo rialzo; abbondanti nevicate verso Calalzo (15-20cm), poi in serata aumento delle temperature e pioggia probabile. Accumuli piovosi fin sui 40-70mm sulle Prealpi. Vento attorno i 50-70km/h in montagna. Temperature minime attorno i +2/+6°C su buona parte delle linee, valori massimi sui +4/+9°C in pianura. **DTP Trieste**: Piogge gradualmente più intense, ma quota neve in aumento fin sui 600-1000m. Accumuli piovosi fin sui 40-70mm sui rilievi. Vento sui 50-70km/h dal pomeriggio in poi. Temperature minime attorno 0/+2°C in montagna, su +5/+9°C altrove; valori massimi sui +6/+10°C in pianura.

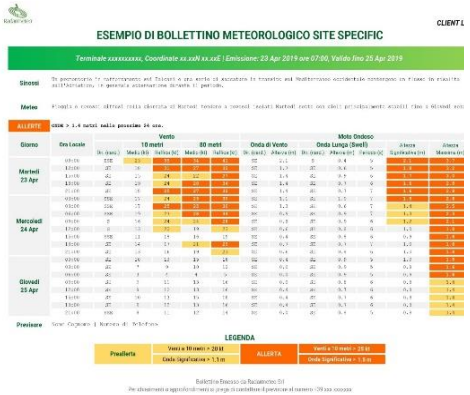
Riepilogo giornaliero delle allerte

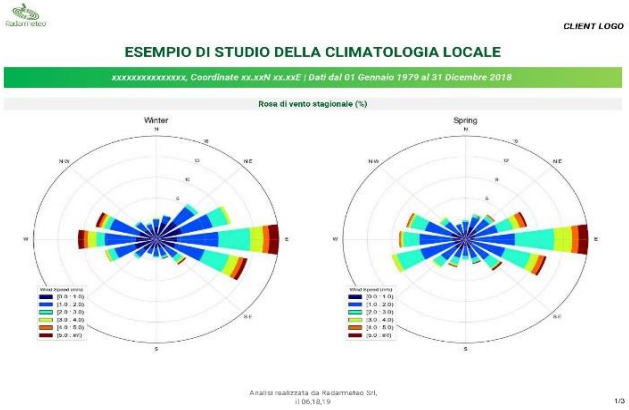
Bollettino realizzato da Radarmeteo Srl — Emissione del 01/02/2019 delle ore 12:00 - Legenda — Pagina n° 1

Weather support for marine operations

SeaCast®

- Weather support 24/7/365 for single sites (offshore platforms, harbors, etc.) or for ship routing
- Long-term ensemble forecast up to 10 days
- Post-event consultation
- Study of local climatology

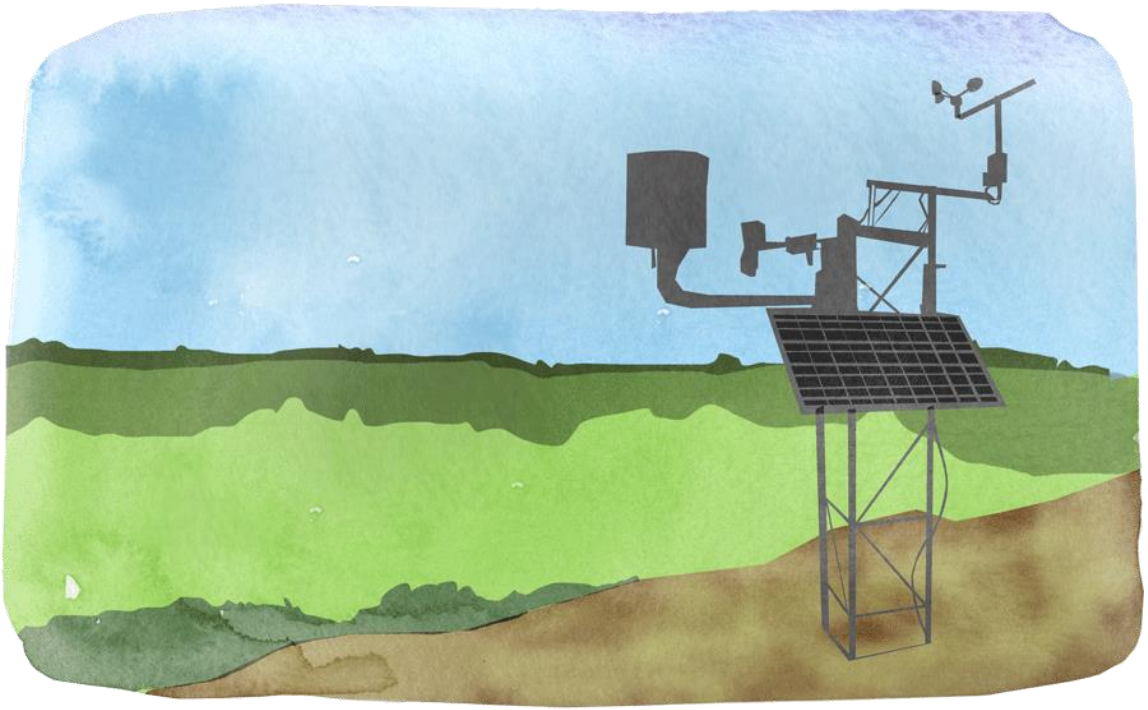

ESEMPIO DI BOLLETTINO METEOROLOGICO SITE SPECIFIC


ESEMPIO DI STUDIO DELLA CLIMATOLOGIA LOCALE

Designing support and certification of weather networks

- Support service in order to analyze, adjust and certificate the weather network in compliance with World Meteorological Organization (WMO) guidelines

- Designing support service for new monitoring networks or for existing networks



DATA: SOURCES AND PROCESSING

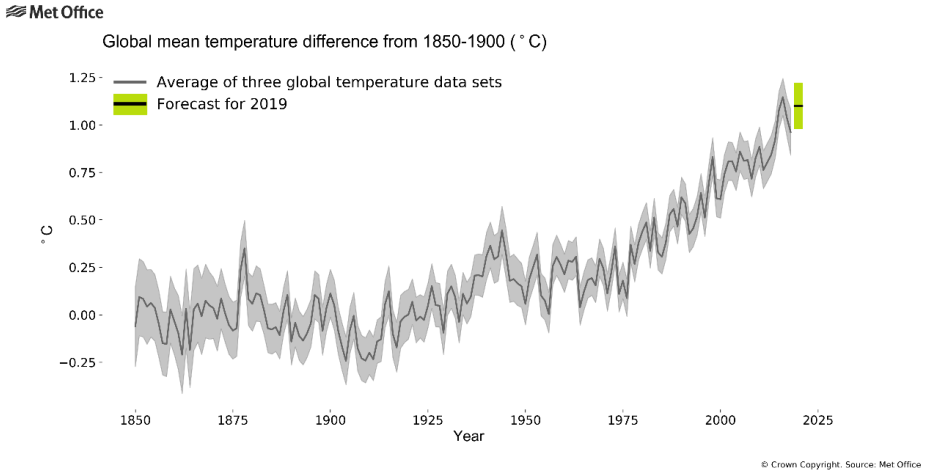
Climate change

Global warming requires a new meteorological answer:

1) an answer on a broader social and cultural level: relations with citizens.

2) an answer on a more advanced technological level: smart and digital applications.

An innovative response to these needs is needed.



New types of meteorology are emerging

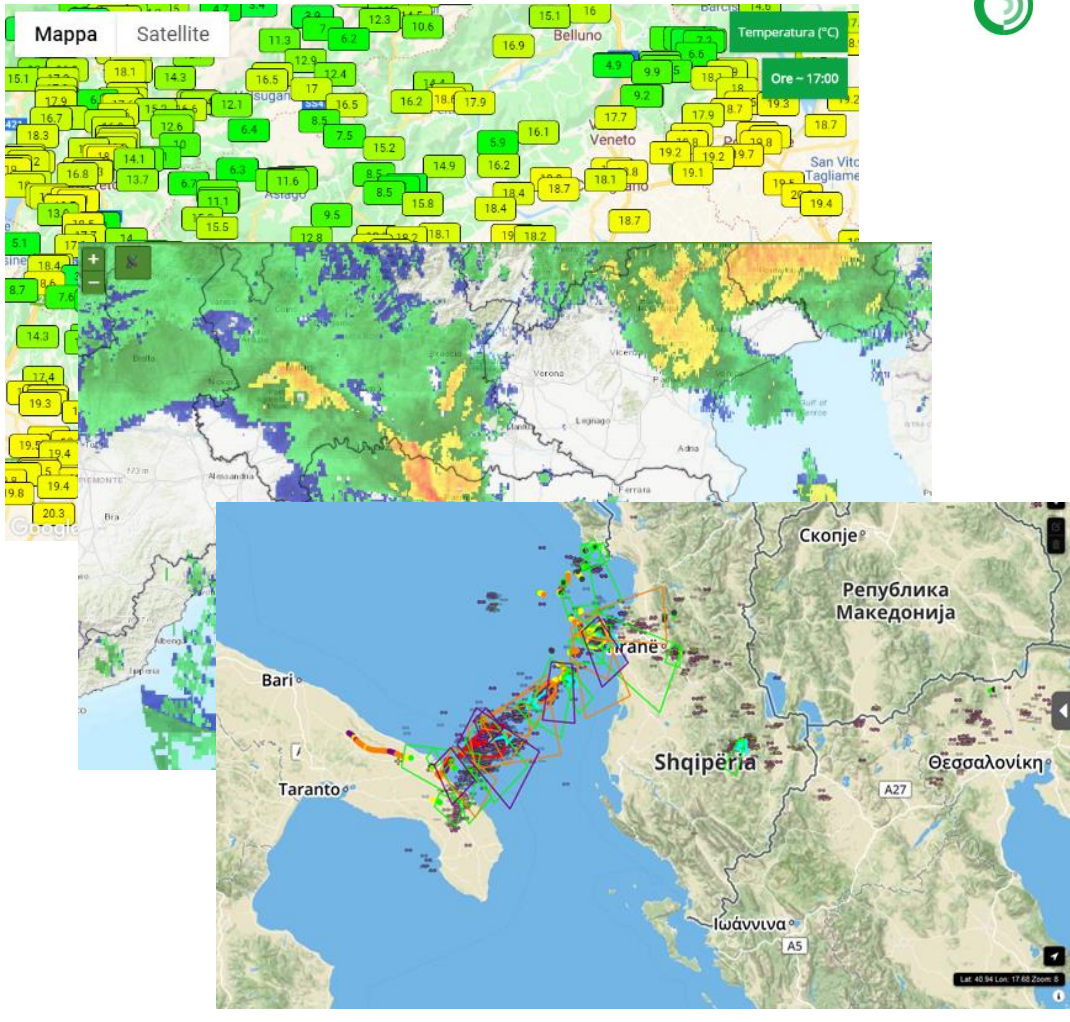
- Precision meteorology
- Formal meteorology
- Legal meteorology
- Conventional meteorology

The common feature? The high degree of representativeness of the data, to allow advanced statistical and/or real-time processing, able to support corporate decision-making systems.

Data representativeness

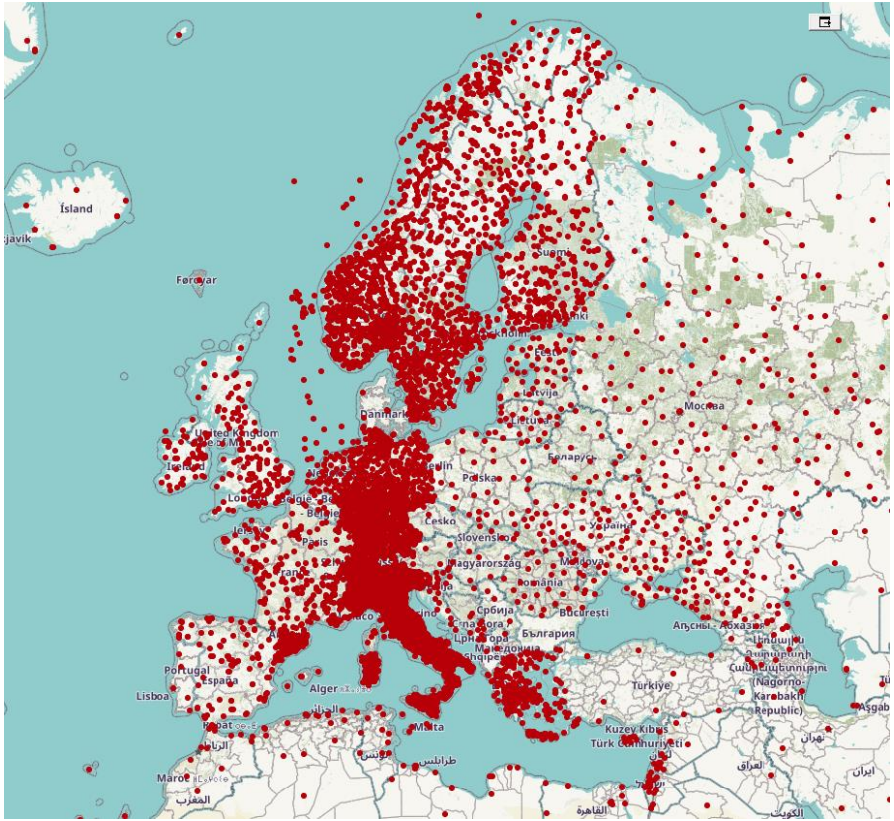
"In the simplest terms, if the data can answer the question, it is representative"

(Ramsey and Hewitt, 2005)



The unified database of meteorological data

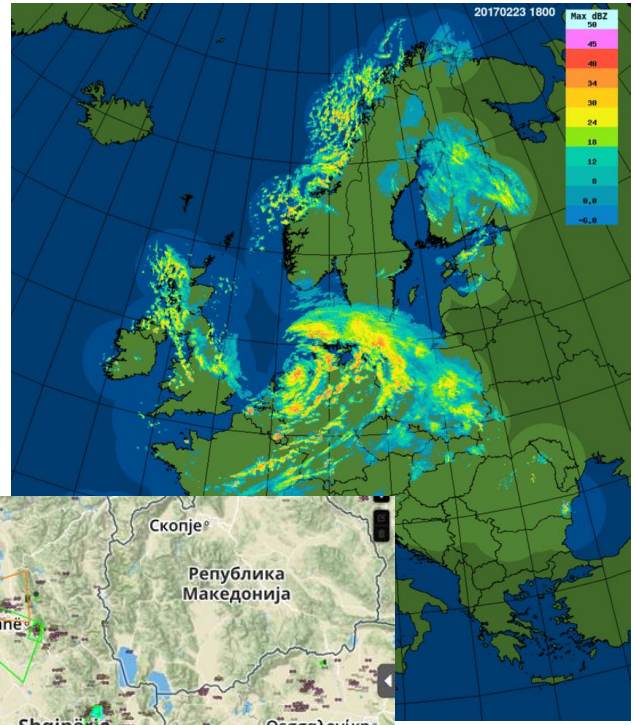
- The unified database of meteorological data developed by Radarmeteo is the first unified collection and archiving system of all the meteorological networks present on the Italian territory and of the main European networks.
- The system collects data from certified, official and WMO compliant networks:
  - Meteorological data, hourly and daily, of about 5,000 in situ stations belonging to more than 30 Italian networks;
  - Daily meteorological data of about 6,000 in situ stations belonging to different European networks.

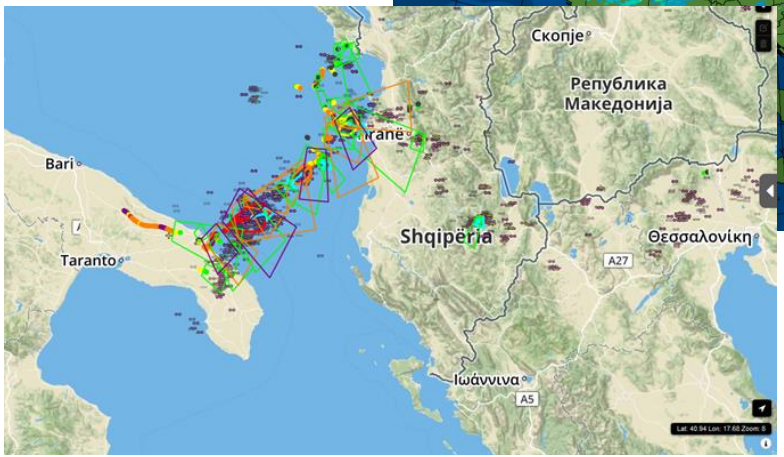


The unified database of meteorological data

The Database also collects data from remote sensing networks:

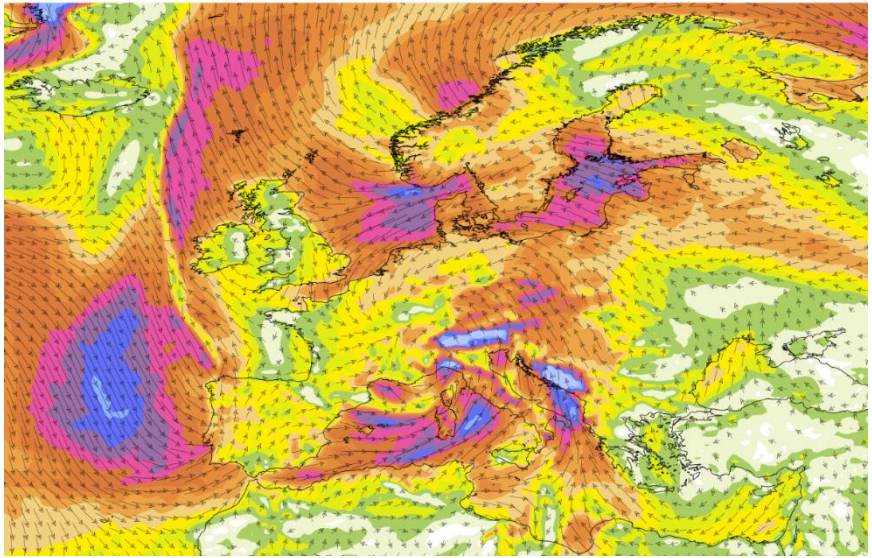
- European radar network (OPERA) and Italian mosaic (Civil Protection Network);
- Global lightning detection network.

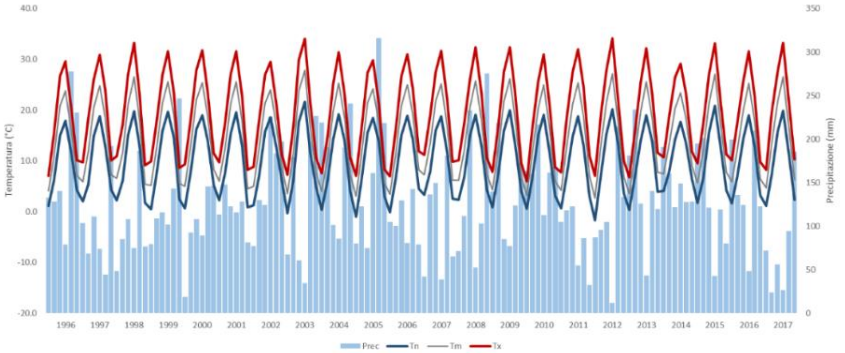




Meteorological re-analysis

METEOROLOGICAL RIANALYSIS is an analysis method that use of numerical models to "re-analyze" historical data and observations, in order to create datasets that describe past states of the atmosphere in a homogeneous way over the entire portion of the territory of interest, be it regional or global



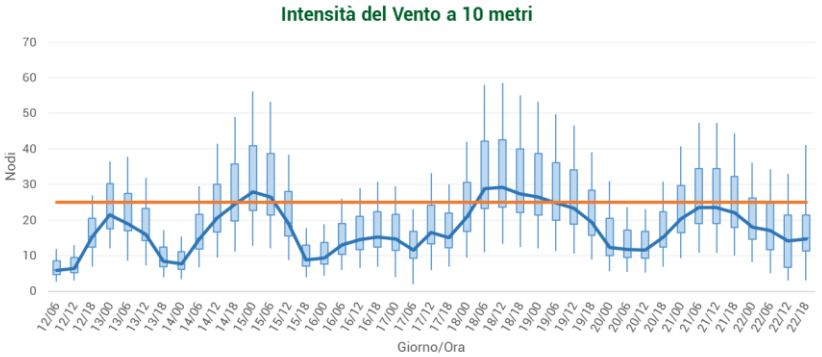


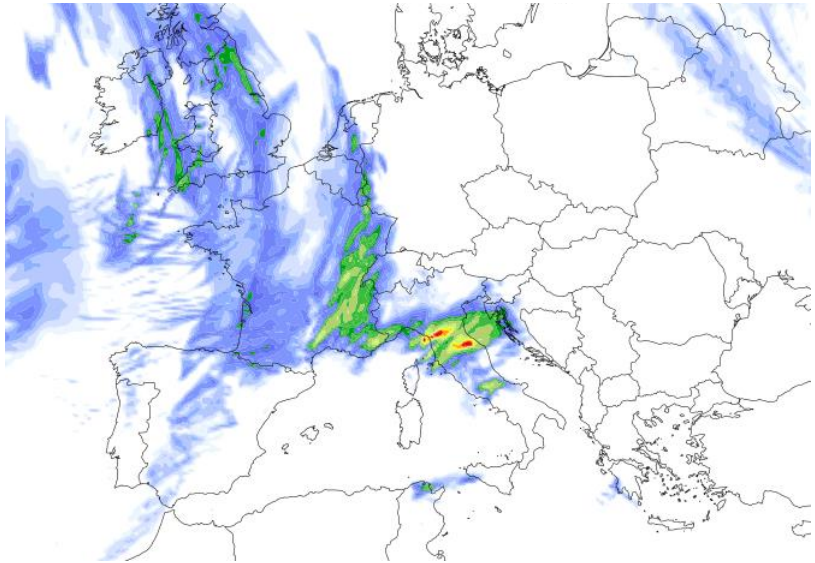
Name	Owner	Spatial coverage	Spatial resolution	Temporal coverage
RadRe-IT	RADARMETEO	Italy	1 km	1990-today
RadRe-EU	RADARMETEO	Europe	10 km	1990-today
RadRe-GL	RADARMETEO	Global	25 km	1979-today

Multimodel Ensemble Forecast

A probabilistic multimodel system based on models implemented directly by Radarmeteo (e.g. WRF-ARW using initialization data is used for the processing of forecast data, i.e. to estimate the future trend of meteorological variables throughout the territory). of the GLOBAL / EUROPEAN ICON model) integrated with other forecast data processed by official Italian and international data centers.

The information obtained from this type of analysis is not limited to mere meteorological data but is also complete with a probabilistic level of the forecast.



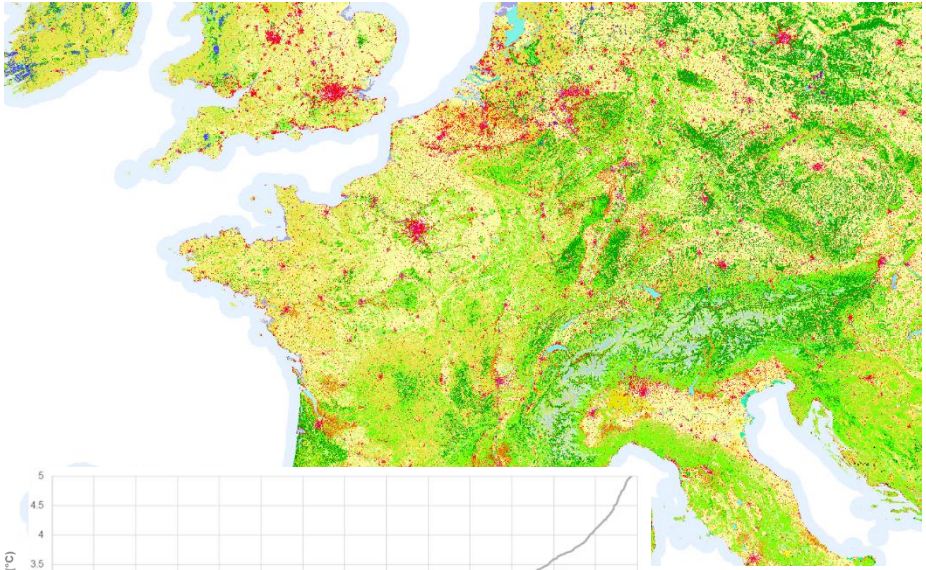


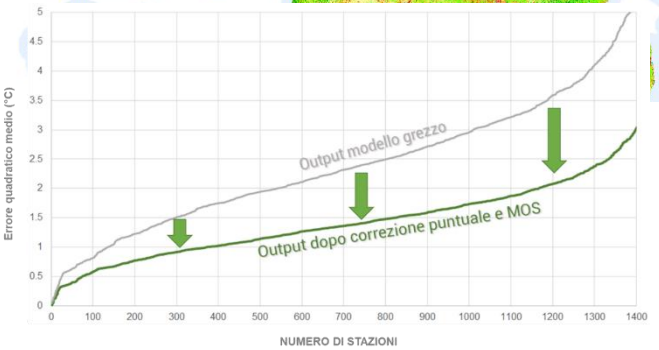
Control, validation and data integration procedures

Data of the monitoring networks are processed with the following procedures:

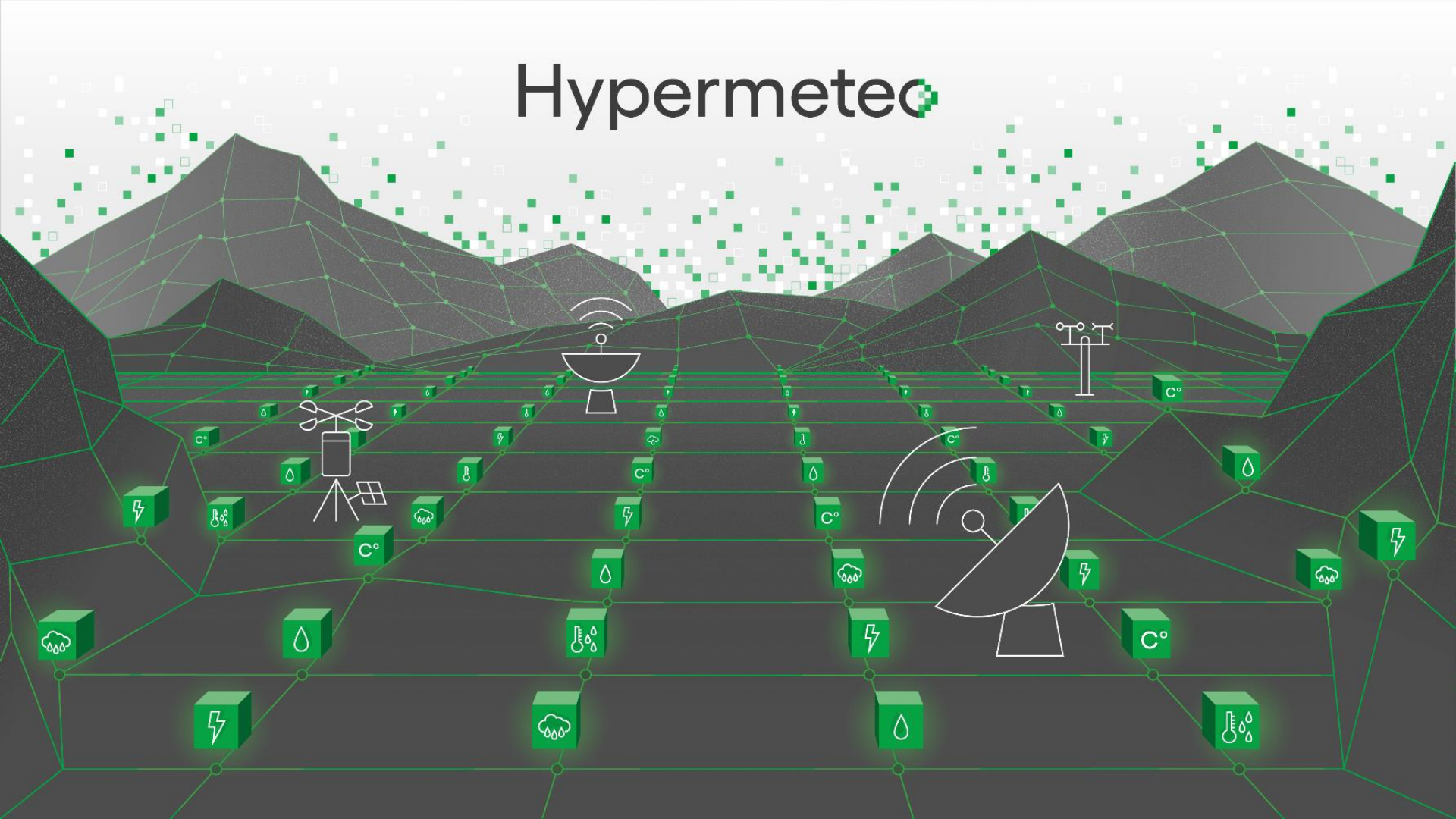
- Automatic control (range test, cross-validation);
- Manual validation by a meteorologist;
- Integration with modeling data through statistical (MOS) and regression methods (using DEM and land use models).

This allows to obtain meteorological datasets with lower drift and uncertainties compared to mere modeling data.





Hypermeteo



Hypermeteo

Historical, real-time and forecast meteorological data on high resolution grids

Completo e omogeneo

Data are provided for all european/global territory and are subjected to verification, control and validation processes.

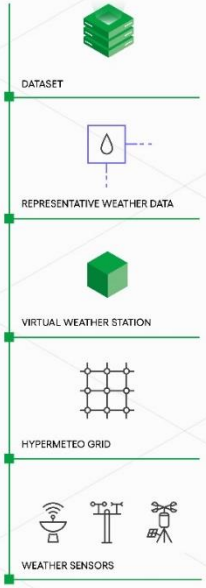
Independent

Data derive from certified, official and WMO compliant weather monitoring networks that meet specific quality, objectivity and transparency criteria.

Easily «pluggable»

Hypermeteo® dataset is structured to easily with third-party services / sysinterfacetems / applications.

Hypermeteo



Hypermeteo
Climate & weather grids

Aggregation of value to existing open data

Use of reanalysis methodologies (or retrospective analysis)

Integration of data of various types (stations, radar, lightning, satellites, ...)

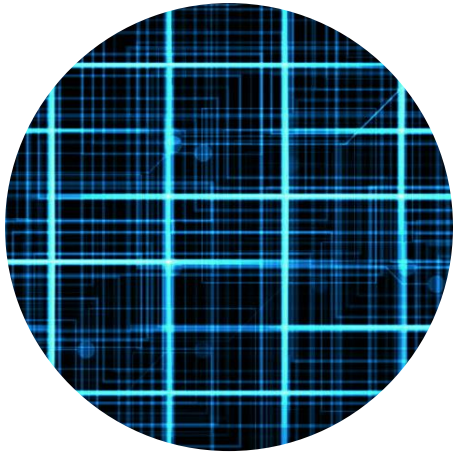
High representativeness of the data on the entire globe

The pointillisme concept

Georges Seurat – «Un dimanche après-midi à l'Île de la Grande Jatte»

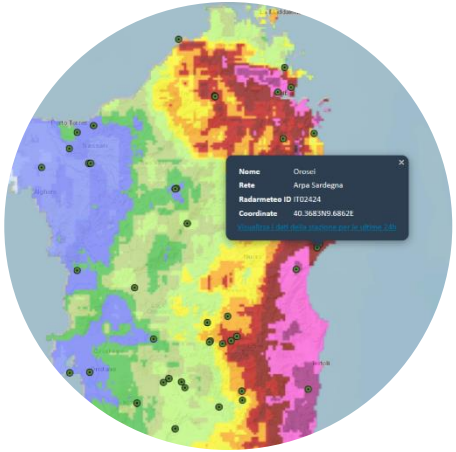
Hypermeteo
Climate & weather grids

Paradigm shift



01 «Virtual» weather station

The weather data is reconstructed with extreme accuracy at each point, regardless of the presence of measurement stations



02 Data integration

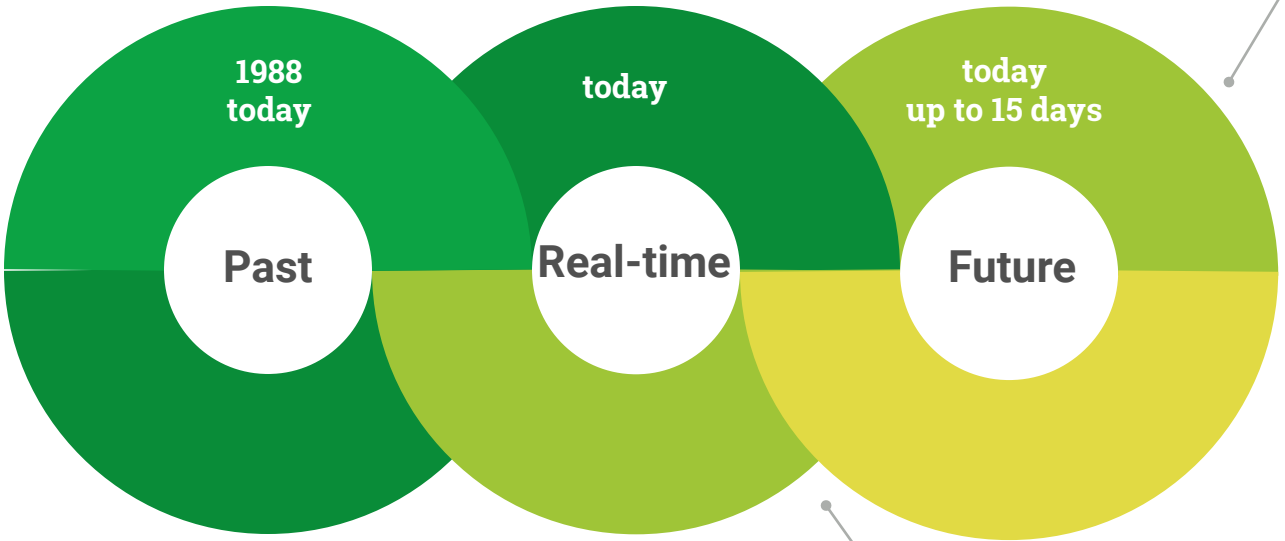
Data integration from ground monitoring networks (weather stations), remote sensing (radar, lightning network, satellites) and numerical modeling

03 Machine learning

AI algorithms allow integration between the different sources, allowing for greater accuracy on the final data

Hypermeteo
Climate & weather grids

Available datasets



Near real-time data

Representative of the current meteorological situation

Forecast data

Representative of the meteorological situation up to 7-15 days

30 years historical data

Multi-decade historical series reconstructed and made homogeneous

Nowcasting data

From +20 to +180 minutes

Hypermeteo
Climate & weather grids

Meteorological variables

TYPE	MAIN VARIABLES	SECOND LEVEL VARIABLES	SPECIALIZED VARIABLES
BASIC PARAMETERS	Temperature at 2m Dew point temperature Relative humidity Precipitation Wind speed and direction (10m) Maximum wind speed (10m) Sea level pressure	Soil temperature Wet bulb temperature Type of precipitation (rain, snow, rain mixed with snow, frostbite, etc.) Cloudiness and fog (visibility) Probability of precipitation	
AGRICULTURE		Leaf wetness Potential evapotranspiration Total evapotranspiration Soil temperature	Plant disease risk indices Indices of yield and vegetative development
INSURANCE		Frequency of exceeding the atmospheric adverse thresholds Probability of exceeding atmospheric adverse thresholds	Insurance risk index
ENERGY	Global horizontal radiation Wind speed and direction at 80m	Normalized direct irradiance Diffuse radiation Normalized global irradiance	Index of producibility Wind rose

Hypermeteo
Climate & weather grids

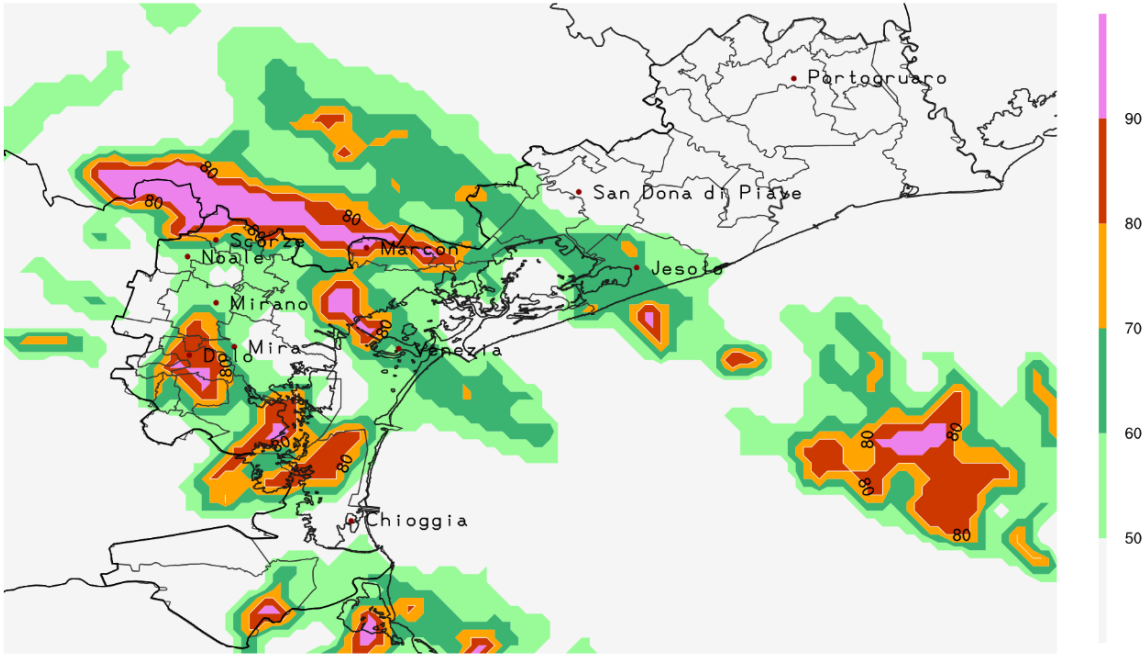
Meteorological variables

TYPE	MAIN VARIABLES	SECOND LEVEL VARIABLES	SPECIALIZED VARIABLES
HYDROLOGY		Average precipitation on the basin Maximum precipitation on the basin Runoff	
MARINE	Surface temperature Height of the sea	Significant wave height Height of the wind wave Average period of the wind wave Significant height of the swells Average swell period Threshold crossing frequency (wave height, wind speed, etc.)	Wind rose (annual, seasonal, monthly, daily) Rose of the distribution of height and direction of the significant wave Rose of the distribution of intensity and direction of sea currents
SEVERE WEATHER	Cloud-to-ground lightning Cloud-cloud lightning	Hail probability Storm indexes	Thunderstorm alerts Cell Tracking

Hypermeteo
Climate & weather grids

Example: hail probability

Event of 7 July 2019

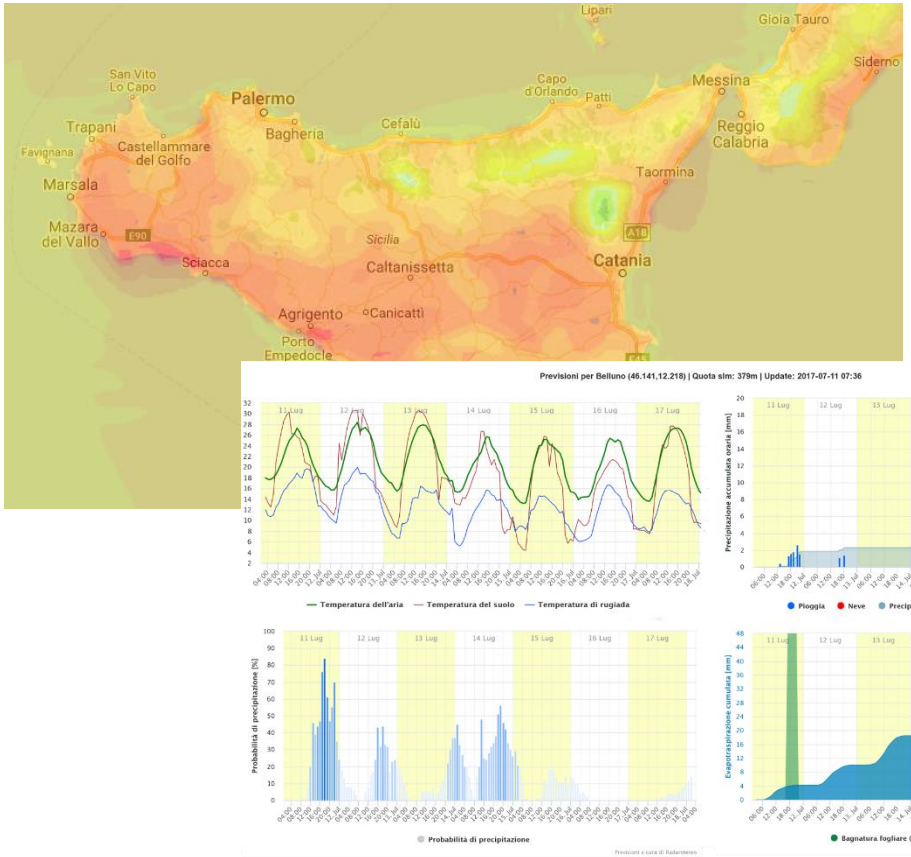


Eventi compatibili con grandine del 07-07-2019			
Comune	Evento	Porzione comunale interessata	Probabilita
Istrana	SI	100%	ALTA
Loria	SI	100%	MEDIA
Mansue	SI	100%	MEDIA
Mareno di Piave	SI	100%	MEDIA
Maser	SI	100%	MEDIA
Maserada sul Piave	SI	100%	ALTA
Meduna di Livenza	SI	100%	BASSA
Miane	SI	100%	MEDIA
Mogliano Veneto	SI	100%	ALTA
Monastier di Treviso	SI	100%	ALTA
Monfumo	SI	100%	MEDIA
Montebelluna	SI	100%	MEDIA
Morgano	SI	100%	ALTA
Moriago della Battaglia	SI	100%	MEDIA
Motta di Livenza	SI	100%	BASSA
Nervesa della Battaglia	SI	100%	MEDIA
Oderzo	SI	100%	MEDIA
Ormelle	SI	100%	MEDIA
Orsago	SI	100%	MEDIA
Paese	SI	100%	ALTA
Pederobba	SI	100%	MEDIA
Pieve di Soligo	SI	100%	MEDIA
Ponte di Piave	SI	100%	MEDIA
Ponzano Veneto	SI	100%	ALTA
Portobuffole	SI	100%	MEDIA
Possagno	SI	100%	MEDIA
Povegliano	SI	100%	ALTA
Preganziol	SI	100%	ALTA
Quinto di Treviso	SI	100%	ALTA
Refrontolo	SI	100%	MEDIA
Resana	SI	100%	ALTA
Revine Lago	SI	100%	MEDIA
Riese Pio X	SI	100%	ALTA

Hypermeteo
Climate & weather grids

Example: forecast models

- High resolution forecast weather data
- Forecasts available in the form of point data (meteograms) and areal (maps)
- Probability predictions of precipitation, snow, frost, etc.
- Model with hourly update and statistical correction (MOS)
- Forecast up to 15 days with probabilistic-ensemble method
- Data provision also via API service (webservice)



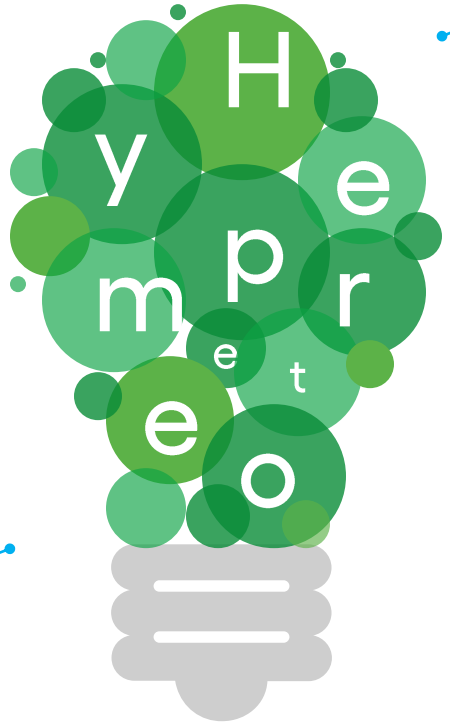
APPLICATIONS

Hypermeteo
Climate & weather grids

Other applications

Smart Agriculture

Smart Home & Domotics



Intelligent e Smart City

Risk assessment e
Insurance Analytics

Predictive in-operation

Connected Mobility

Thank for your attention!

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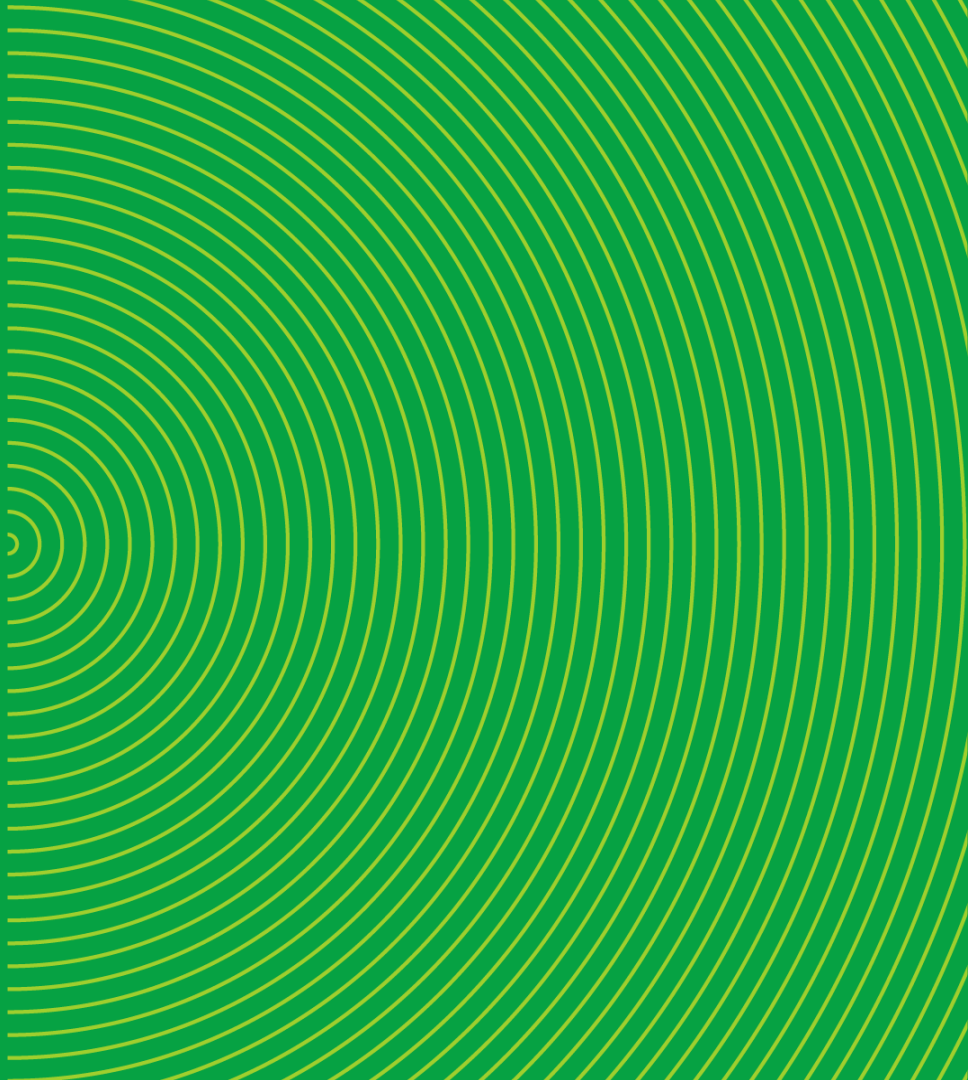
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