"G. D'Annunzio" University
Chieti – Pescara
Earthquake and Enviromental Hazard PhD

Research Project

Study of the evolution of atmosferic pollution in the Abruzzo Region: focus on areas of high hazard to human health

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Objective of the research

The study will focus on the detection of pollutants present in the troposphere of the Abruzzo Region in both form: gaseous and in the form of atmospheric particulate

The main objective consists in applying

Analytical Techniques
(particle chemical speciation)

Modeling
(regressive techniques and neural networks)

to identify the emission sources of polluted sites where there are exceeding the limits of the law for protection of human health

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Evaluation of air quality environment

is conducted using:

- ✓fixed sampling sites
- ✓mobile sampling sites
- ✓statistical method
- ✓mathematical models

The regional territory is **divided** into zones and agglomerations in order to asses the quality of air

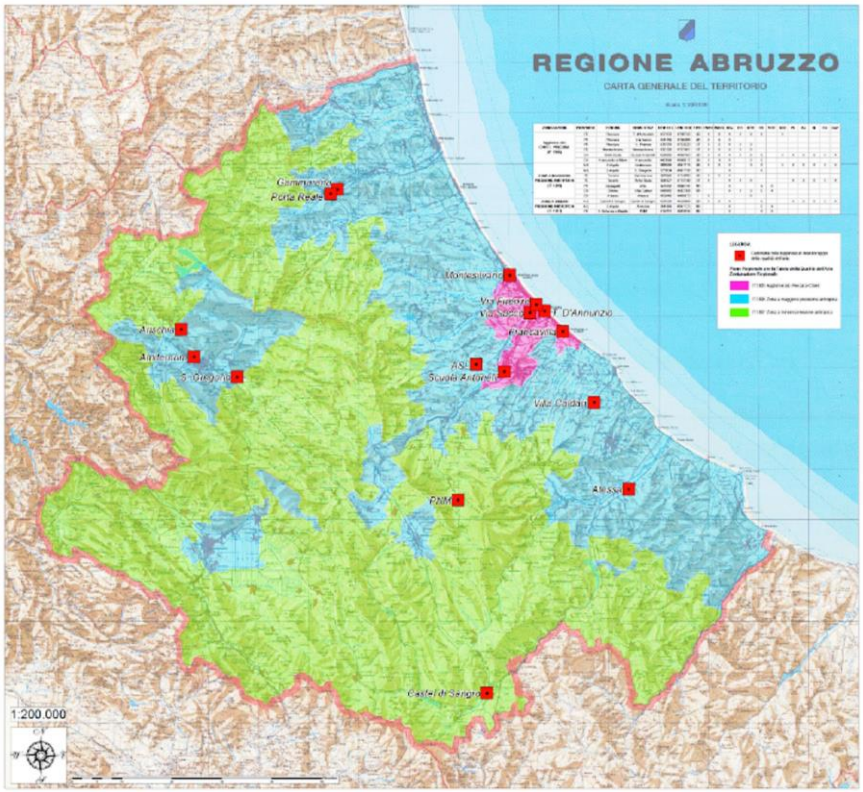
Framework of the study area and its zoning

It provides:

an agglomeration: which area includes the six districts of Chieti, Pescara, Montesilvano, Spoltore, San Giovanni Teatino and Francavilla al Mare for a population of 280.000 residents

a zone with greater anthropic pressure (about 800.000 inhabitants of districs of AQ, TE and others 109)

a zone with less anthropic pressure (about 255.000 inhabitants, 188 districts)



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State of the art of research

The research project starts from the collection of air quality data of the Network Region managed by Arta Abruzzo from 1 January 2017

	PROV.	COMUNE	NOME STAZ	UTM-X	UTM-Y	TIPO	PM10	PM2,5	NOx	CO	BTX	O3	SO2	Pb	As	Ni	Cd	BaP
	PE	Pescara	*T. D'Annunzio*	N 4700733 m	E 437102 m	UB	X	X	X	X	X	X	X					
Agglomerato	PE	Pescara	*Via Sacco*	N 4700366 m	E 434150 m	UB	X		X									
CHIETI - PESCARA	PE	Pescara	*V. Firenze*	N 4702020 m	E 435376 m	UT	X	X	X	X	X							
(IT 1305)	PE	Montesilvano	*Montesilvano*	N 4707801 m	E 430126 m	UT	X	X	X	X	X							
	CH	Chieti Scalo	*Scuola Antonelli*	N 4688783 m	E 429050 m	UB	X	X	X		X	X	X	X	X	X	X	X
	CH	Francavilla al Mare	*Francavilla*	N 4697015 m	E 429050 m	UB	X	X	X		X	X						
	AQ	L'Aquila	*Amiternum*	N 4691713 m	E 366938 m	UB	X	X	X		X	X	X	X	X	X	X	X
ZONA A	AQ	S Gregorio	*S Gregorio*	N 4687738 m	E 375604 m	SB			X		X	X						
MAGGIORE	TE	Teramo	*Gammarana*	N 4724660 m	E 395690 m	UB		X	X		X							
PRESSIONE ANTROPICA	TE	Teramo	*Porta Reale*	N 4723748 m	E 394297 m	UT	X		X	X				X	X	X	X	X
(IT 1306)	PE	Cepagatti	*ASL*	N 4690147 m	E 423332 m	RB			X		X	X						
	CH	Ortona	*Villa Caldari*	N 4682708 m	E 446950 m	SB			X	X	X	X						
	CH	Atessa	*Atessa*	N 4665673 m	E 453840 m	I	X			X	X							
ZONA A MINORE	AQ	Castel di Sangro	*Castel di Sangro*	N 4625609 m	E 425526 m	SB	X	X	X	X		X		X	X	X	X	X
PRESSIONE ANTROPICA	AQ	L'Aquila	*Arischia*	N 4697123 m	E 364389 m	RB			X		X	X						
(IT 1307)	PE	S.Eufemia a Maiella	*PNM*	N 4663534 m	E 419701 m	RB			X		X	X						

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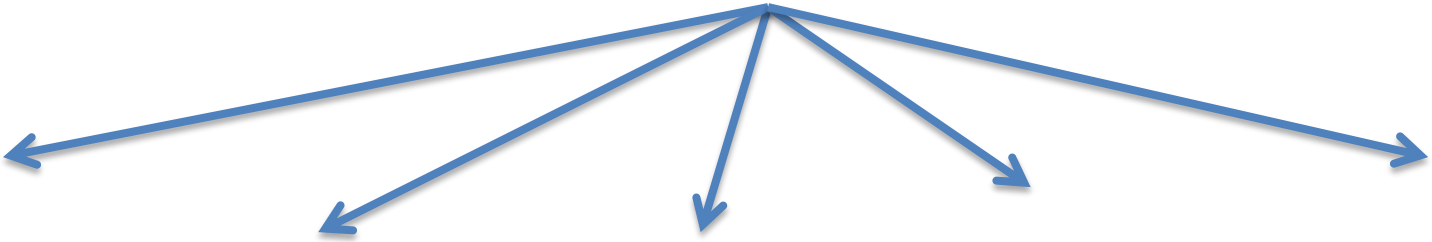
Materials and Methods

Samples are represented from

air sampled continuously from analyzers located at the air quality monitoring stations

particulate atmospheric collected in 24 hours on filters

Atmospheric pollutants



GASEOUS

NO_2
SO_2
CO
O_3

VOLATILE ORGANIC COMPOUND (VOC)

Benzene

PARTICULAR MATTER

PM_{10}
$PM_{2,5}$

METALS

Arsenic
Cadmium
Nickel
Lead

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)

Benzo (a) pyrene

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Analysis of atmospheric particulate matter (PM_{10})

Scanning Electron Microscope (SEM)

physical chemical characterization

chemical speciation

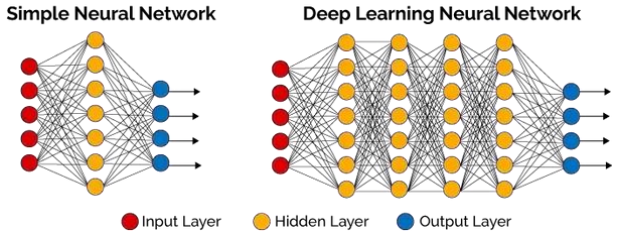
mineral analysis micrometric fibrosis of pyroxene

Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)

Arsenic
Cadmium
Nickel
Lead

High Performance Liquid Chromatography (HPLC)

Benzo(a)pyrene



Modeling Analysis

The modeling analysis will allow:

- ❑ to estimate the concentration of PM, NOx, Ozone and others atmospheric compounds in areas where there are no specific measures
- ❑ to determine meteorological parameters
- ❑ to determine chemical-physical parameters

Expected Results

The research project will try to highlight the evolution of air pollution in the whole regional area and to identify the areas at greatest risk for the population

in particular it will try to interpret

- the sources
- the phenomena
- the meteorological and environmental conditions

that define and facilitate the accumulation of polluting in specific areas of the Abruzzo territory

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THANK YOU ALL FOR YOUR ATTENTION