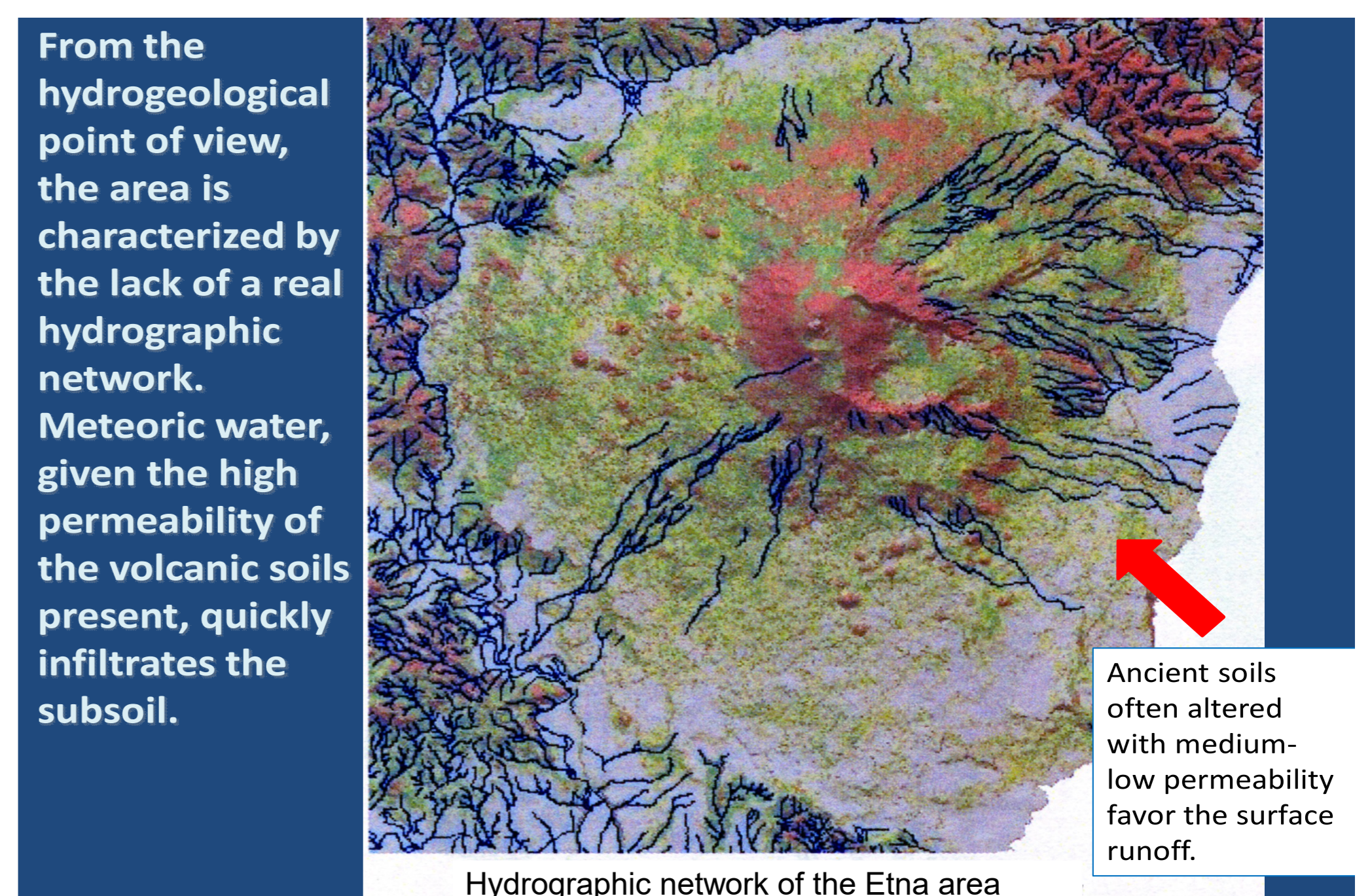
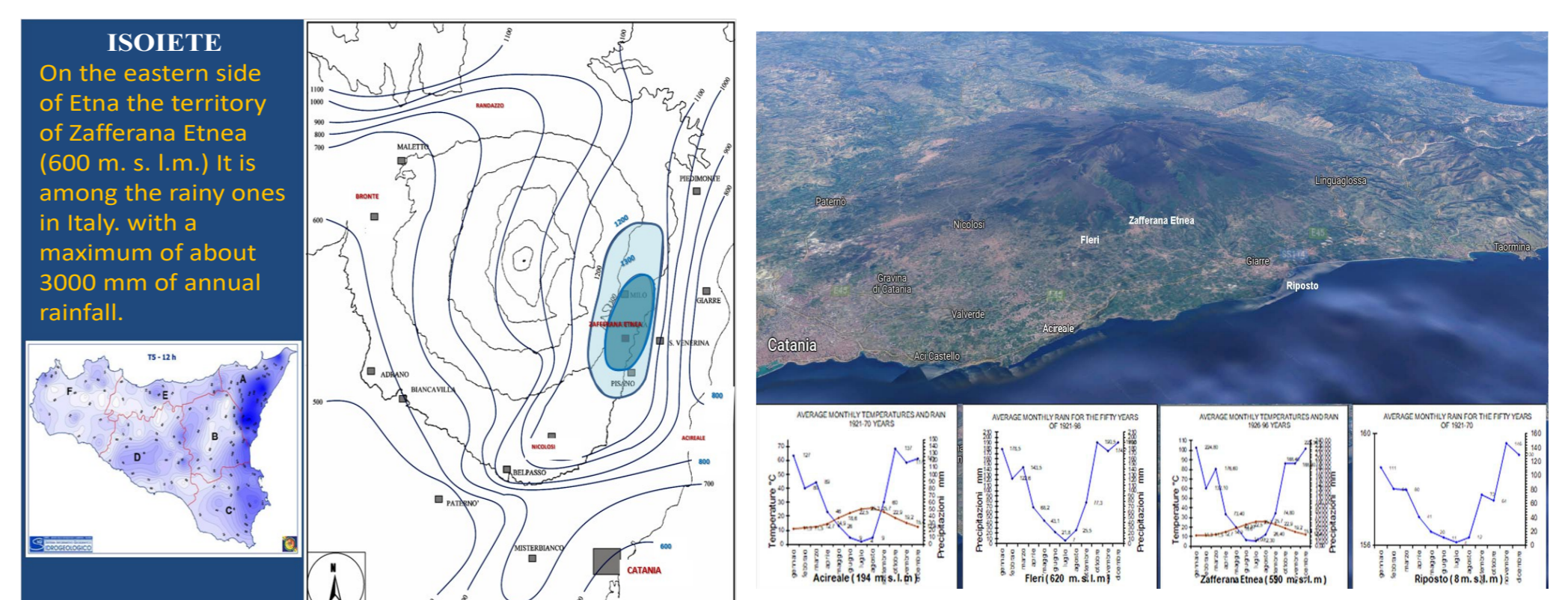
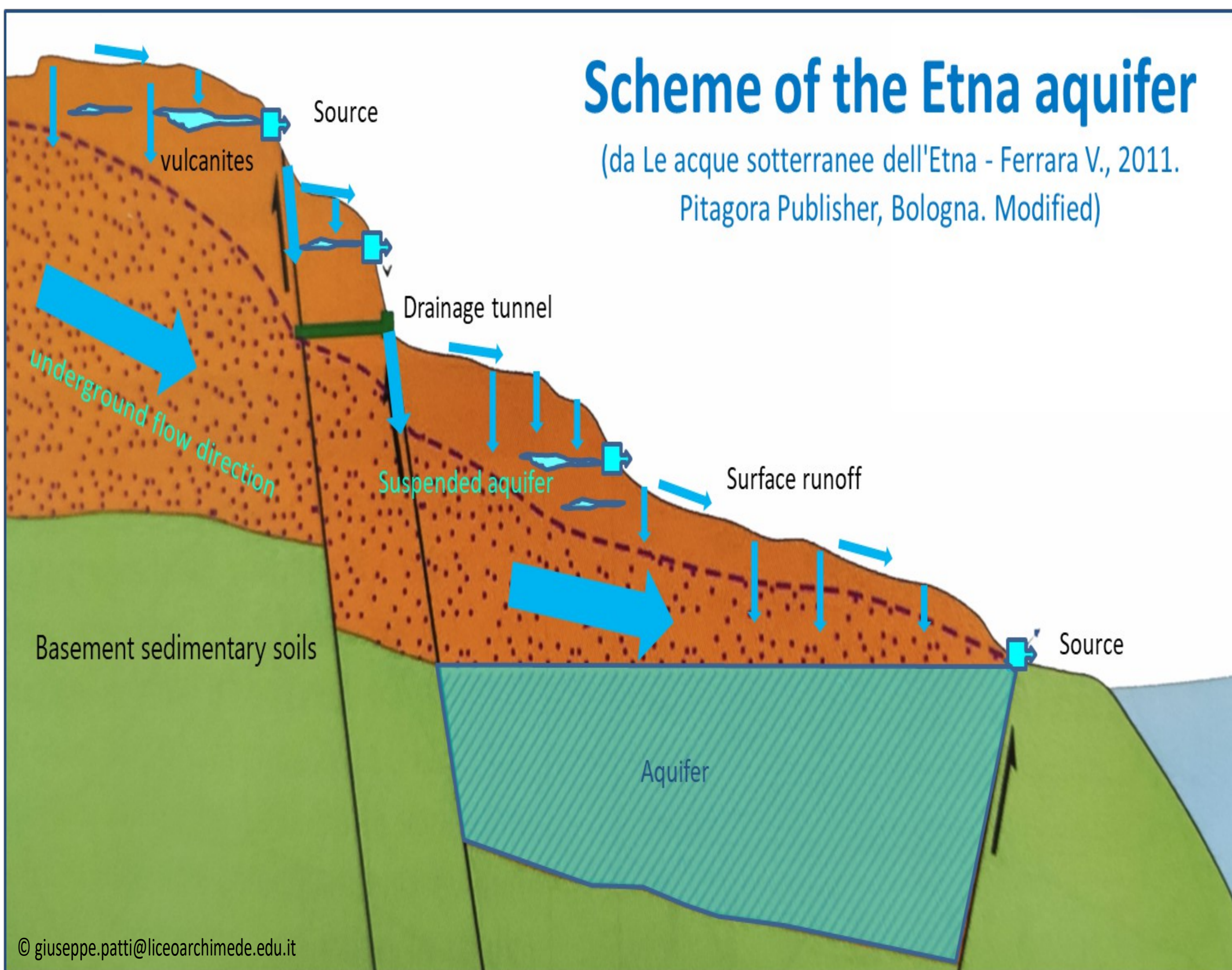


"DROP BY DROP: DISCOVERING THE SURFACE AND UNDERGROUND WATERS OF THE ETNA TERRITORY"

Liceo "Archimede"
 Acireale (Italy)

Context

Inside the volcanic massif of Etna there is an important underground water circulation, fed annually by the infiltration of a high percentage of precipitation water. A part of this water is captured by an impressive system of works, tunnels and wells, and used for agricultural and anthropic uses (Catania and other centers in central and eastern Sicily). The quality of Etna's waters is usually high due to the intrinsic nature of the Etna subsoil which has a very high self-purifying power due to mechanical filtration or adsorption processes. However, the anthropic contribution of the urban settlement and agricultural activity (nitrates, sulphates, chlorides), can represent a source of mineralization and pollution. On the eastern side of Etna, the presence of ancient volcanic formations, partially altered, favors the presence of numerous suspended aquifers which feed perennial and temporary springs. However, the decrease in rainfall in the last 30 years and the excessive withdrawal of water have led to the disappearance of many sources and the decrease in the flow rate of the few remaining sources.



Withdrawals



Laboratory

The students monitored some significant sources for localization in the area's hydrogeology. Below we present the results of the monitoring of some chemical parameters in water samples taken from springs or streams on the eastern side of Etna in the period April 2022 - March 2023. Summing up: The waters of the eastern side of Etna are characterized by an excellent quality and, in general, by a not excessive mineralization. However, it must be emphasized

- Dangerous signs of overexploitation of the groundwater
- Dangerous signs of nitrate/nitrite pollution

The responsible use of water is closely linked to the continuous monitoring of their quality.

	REITANA Cascade	REITANA Mill	NIZZETI	ALCANTARA Mouth	S. MARIA LA SCALA Cascade	S. MARIA LA SCALA Mill	PIANO DELL'ACQUA	FIUMEFREDDO
Hardness Ca²⁺ (mg/Litre)								
dec-22	10,6		14,5	11,3	6,5	10,5		
mar-23	10,6		13,6	12,6	6,5	9,1	4,3	6,3
Total dissolved solids (mg/Litre)								
dec-22	161		157	168	142	147		
mar-23	172		162	251,1	143,6	155	325	328
pH								
dec-22	7,53	7	7,4	8,3	7,6	8,3		
mar-23	7,4		7,01	8,36	7,95	7,85	8,08	7,9

	REITANA Cascade	REITANA Mill	NIZZETI	ALCANTARA Mouth	S. MARIA LA SCALA Cascade	S. MARIA LA SCALA Mill	PIANO DELL'ACQUA	FIUMEFREDDO
Elct. Conduc-tivity µS/cm (20°C)								
sept-22	874	1088						
dec-22	1030	1033	948	1120	1160	860		
mar-23	1030		931	783	847	851	683	665
ion (mg/Litre)								
sept-22								
dec-22		Cu ²⁺ (10) NO ₃ (75) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (75) NO ₂ (0,5) Cl (0) Fe ^{2+,3+} (2)	Cu ²⁺ (10) NO ₃ (5) NO ₂ (0,5) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (50) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (50) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (5) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (25) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)
mar-23	Cu ²⁺ (10) NO ₃ (100) NO ₂ (0) Cl (0) Fe ^{2+,3+} (2)	Cu ²⁺ (10) NO ₃ (75) NO ₂ (0) Cl (0) Fe ^{2+,3+} (2)	Cu ²⁺ (10) NO ₃ (75) NO ₂ (0) Cl (0) Fe ^{2+,3+} (2)	Cu ²⁺ (5) NO ₃ (10) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (5) NO ₃ (75) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (10) NO ₃ (5) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (5) NO ₃ (0) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)	Cu ²⁺ (5) NO ₃ (25) NO ₂ (0) Cl (0) Fe ^{2+,3+} (0)

