WANDERING ALONG APENNINIC FRESH WATERS

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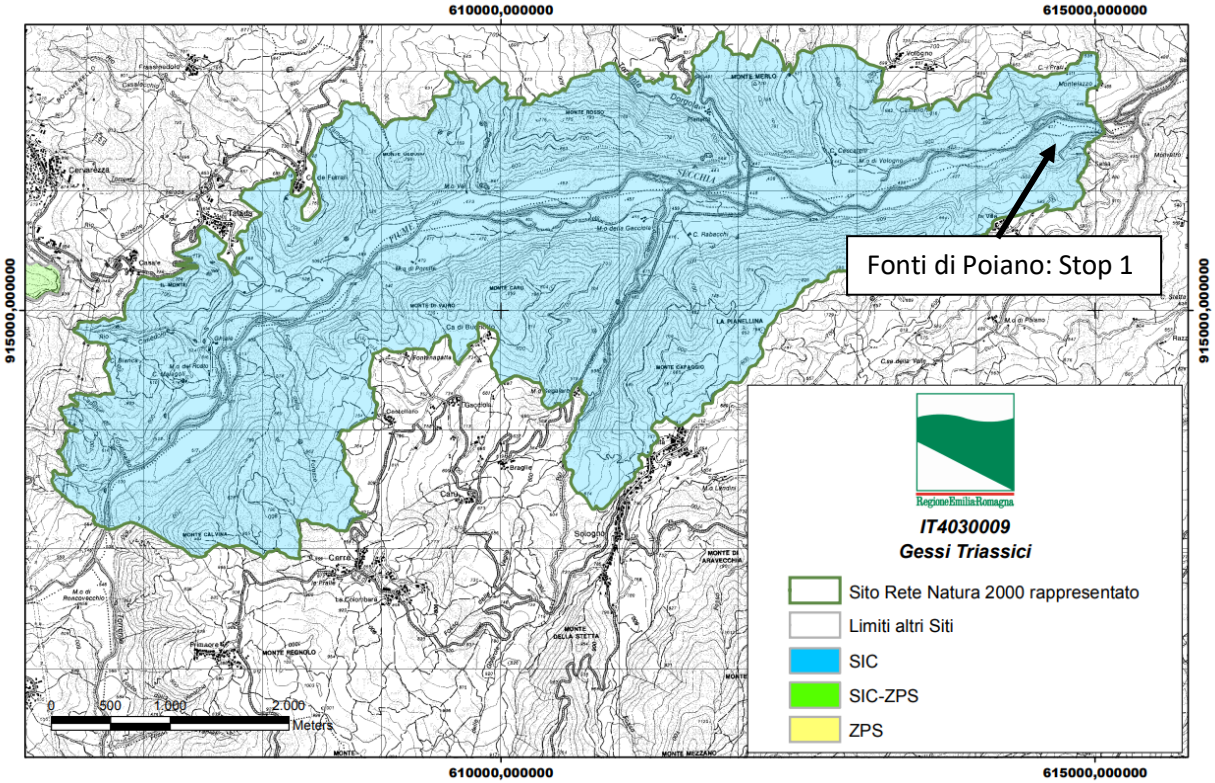
STOP N°1 – POIANO SPRINGS
Natural Reserve – Natura 2000 site

MUNICIPALITIES: Castelnovo né Monti, Villa Minozzo, Busana (Reggio Emilia)

RIVER BASIN: Upper Secchia river valley

GEOLOGY: Triassic gypsum formation («Gessi di Sassalbo»; «Formazione di Burano») with blocks of dolostones (evaporitic, white coloured) deposited 200 My ago in hot saline lagoons (sabkha environment). The formation is encapsulated in a mainly clayey complex («argille scagliose») by orogenesis.
The oldest sedimentary formations in Emilia-Romagna



STOP N°1 – POIANO SPRINGS

ECOLOGY: Gravel bed of Secchia river with riparian habitat.

Vegetation: Wetland with sedge family plants (*Cladium mariscus*) and calcareous fens (*Caricion davallianae*). More or less turbid waters particularly rich in dissolved bases (pH usually > 7); in deep, open waters, associations of large pondweeds (*Magnopotamion, Hydrocharition*). Riparian shrubs (*Myricaria germanica; Salix elaeagnos*), Common water-crowfoot (*Ranunculus aquatilis*). Riparian forests (*Salix alba, Populus Alba*). Garrigue scrubland. Chestnut tree forest

Stygofauna: Freshwater amphipod crustaceans like *Niphargus poianoi* (endemism of saline sulphatic waters)

Niphargus poianoi

STOP N°1 - POIANO SPRINGS

HYDROGEOLOGY: Poiano springs is the major spring in Emilia-Romagna. Karst spring with very typical Groundwater Dependent Ecosystem
Rheocrene with lotic environment
Class 3 Meinzer. Sulphatic waters
Q 280 – 750 L/s; T°C 8,8-11, Electrical conductivity 8.900-17.500 µS/cm, pH 7,1-7,6.

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STOP N°2 – FONTANILI VALLE RE (RESURGENCES)
Natural Reserve – Natura 2000 site

MUNICIPALITIES: Campegine (Reggio Emilia)

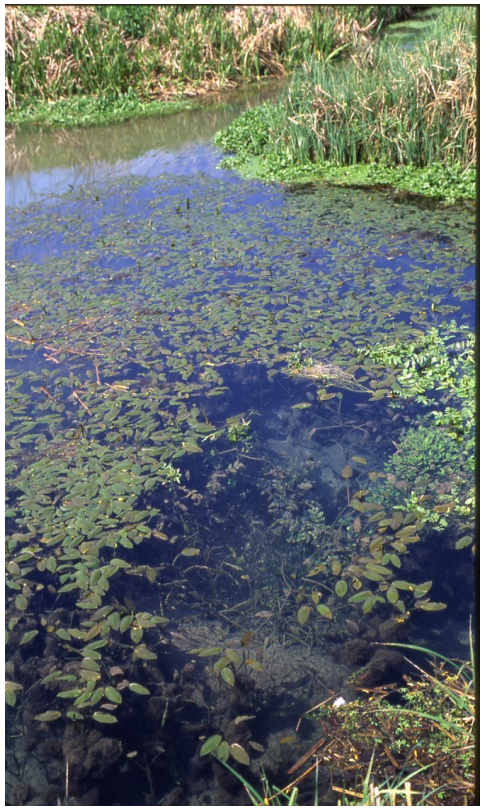
RIVER BASIN: Enza river basin

GEOLOGY: total surface of about 35 hectares in the medium alluvial Padana plain between 31,5 and 37,6 m a.s.l., between Reggio Emilia and Parma along Emilia route and nearby A1 highway

STOP N°2 – FONTANILI VALLE RE (RESURGENCES)

ECOLOGY: Wetlands and ponds with also artificial canals used for irrigation.
Vegetation: Wetlands with hydrophile association of plants. Common alder (*Alnus glutinosa*), Alder buckthorn (*Frangula Alnus*), Grey willow (*Salix cinerea*), Marsh horsetail (*Equisetum palustre*). Sedges (*Carex sp.*), Common reed (*Phragmites australis*), Water flag (*Iris pseudacorus*)

Fauna: Bony fishes like small Gobiidae «panzarolo» (*Knipnowitschia punctatissima*), endemic in resurgences. Water invertebrates, molluscs, crustaceans, amphibians, reptiles like European pond turtle (*Emys orbicularis*), water fowls, small mammals

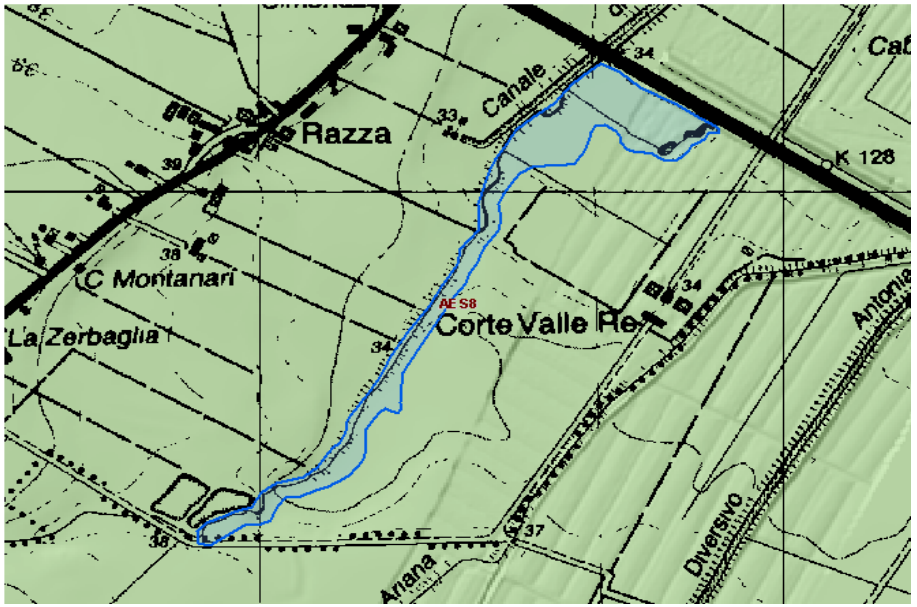


STOP N°2 – FONTANILI VALLE RE (RESURGENCES)

HYDROGEOLOGY: One of the last residual resurgences (*risorgive*, *fontanili*; *fontanazzi* or *laghi* in local dialect) in Emilia-Romagna. Type B spring (barrier) due to low permeability clays opposing to groundwater flow in gravels in alluvial fans and river beds.
Many resurgences in Emilia-Romagna have been impacted by groundwater pumping for irrigation demand

Limnocrene with lentic environment, helocrene wet meadows

Clear water with air bubbles and water vapour mist in winter, T°C 13-17, Electrical conductivity 700-900 µS/cm, pH 7,1-7,5, Eh 135-165 mV



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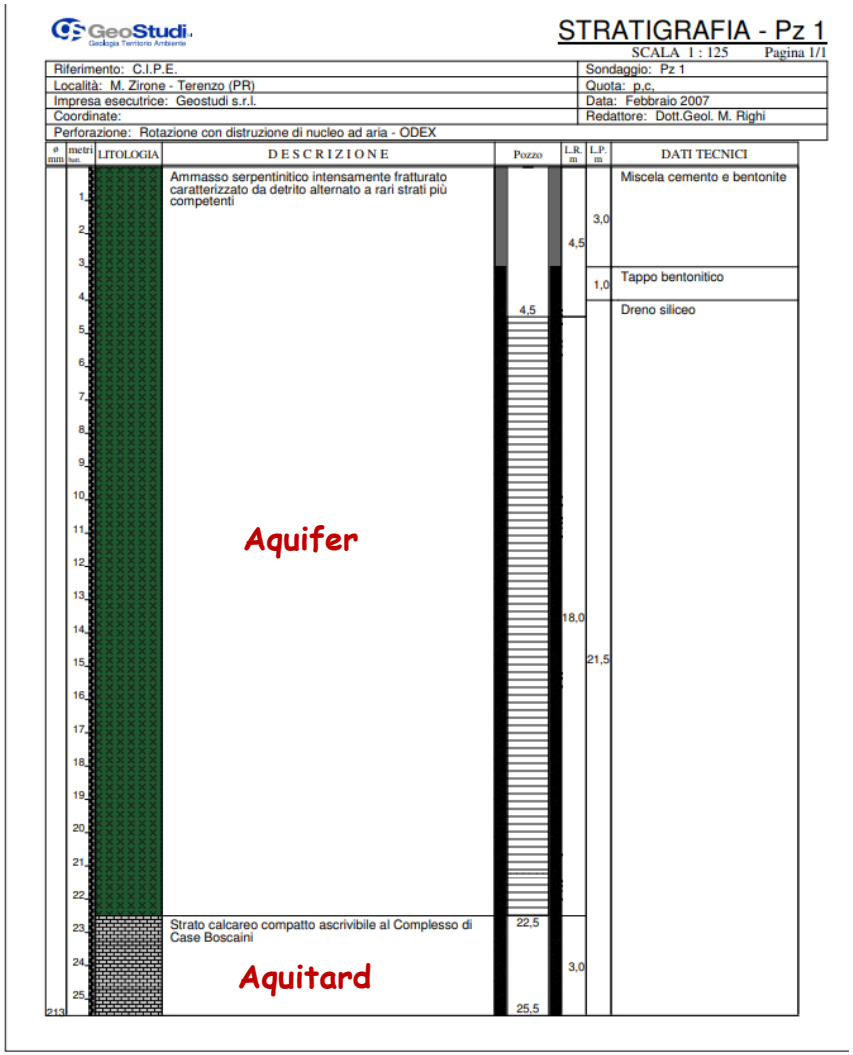
STOP N°3 – BOREHOLE MONITORING

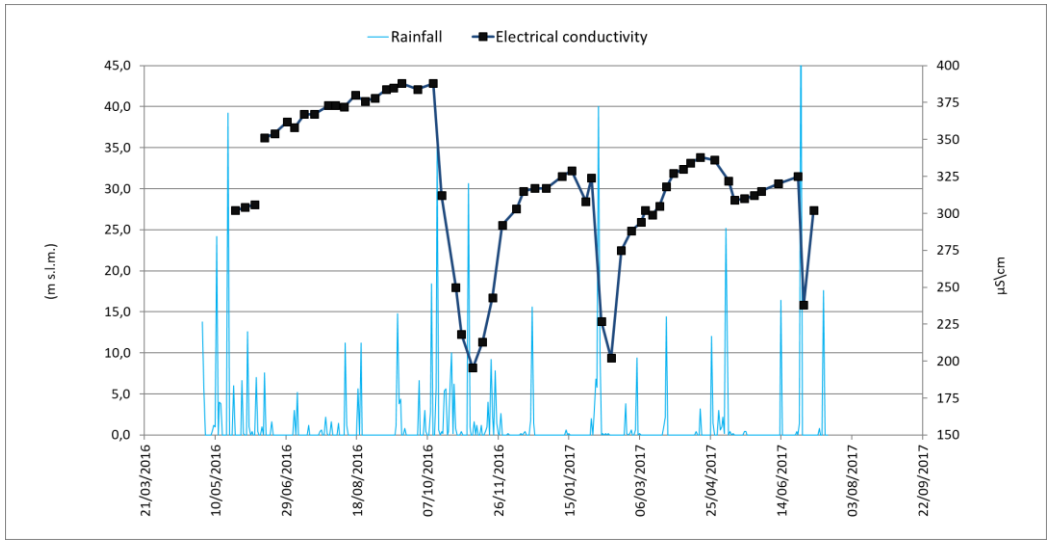
MUNICIPALITIES: Fornovo (Parma)

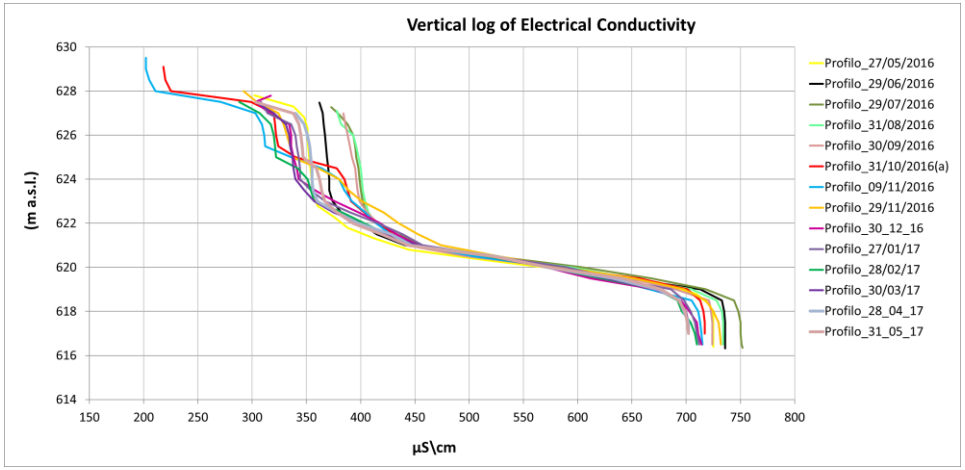
RIVER BASIN: Taro river basin

GEOLOGY: borehole 25 m deep drilled in magmatic rock (serpentinite, a type of ophiolitic rock)

HYDROGEOLOGY: It will be provided examples of hydrogeological monitoring of boreholes





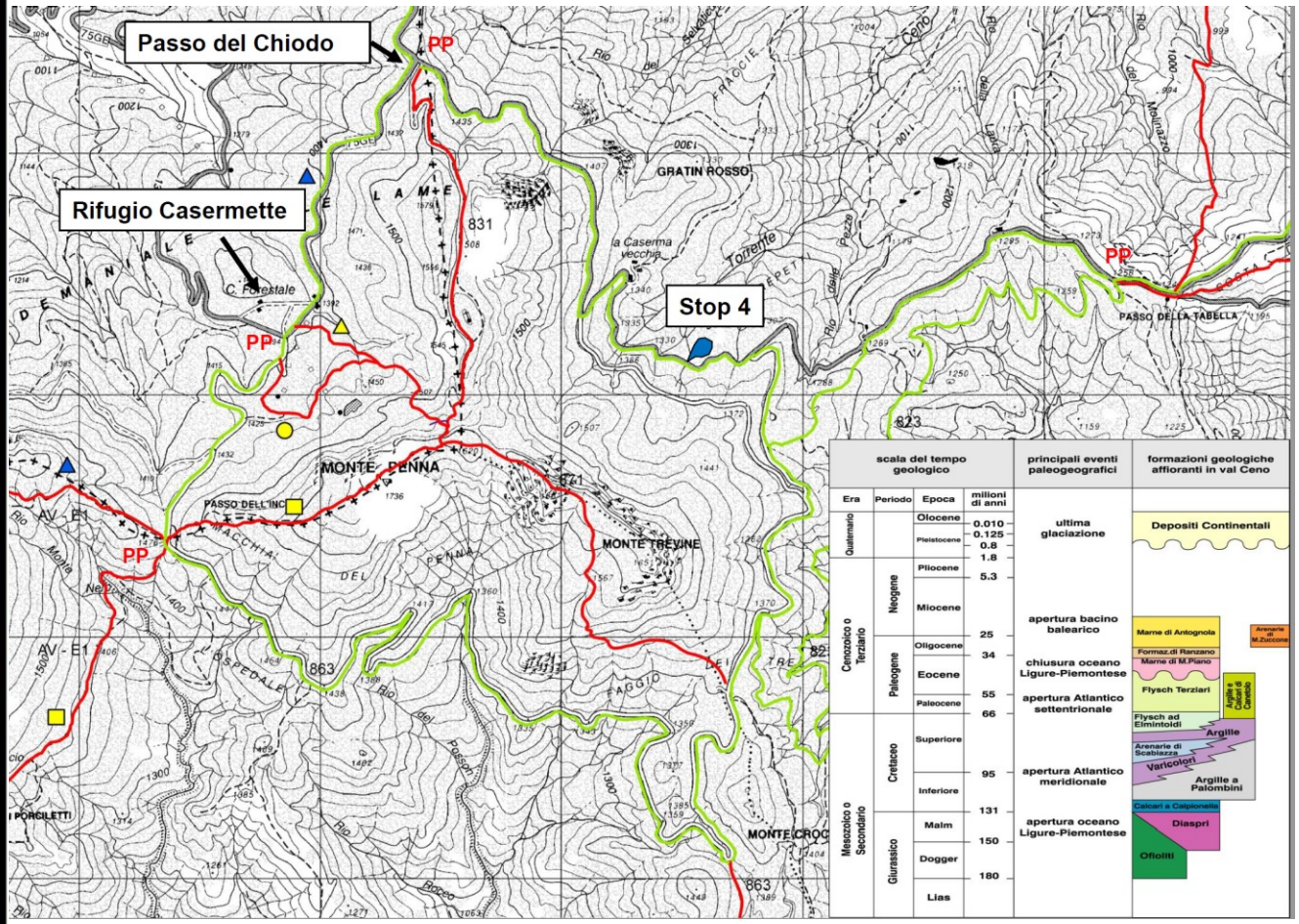


STOP N°4 – PENNA MOUNTAIN-1735 m a.s.l. (SPRINGS)
Oasis of faunistic protection (438 ha) – Natura 2000 site

MUNICIPALITIES: Liguria, Bedonia (Parma)

RIVER BASIN: Ceno, Taro river basin

GEOLOGY: Basalts, type of effusive ophiolitic magmatic rocks representing residues of the oceanic floor of an ancient ocean (Tethys) dating back to Jurassic period. Often in typical form of «pillow lavas»



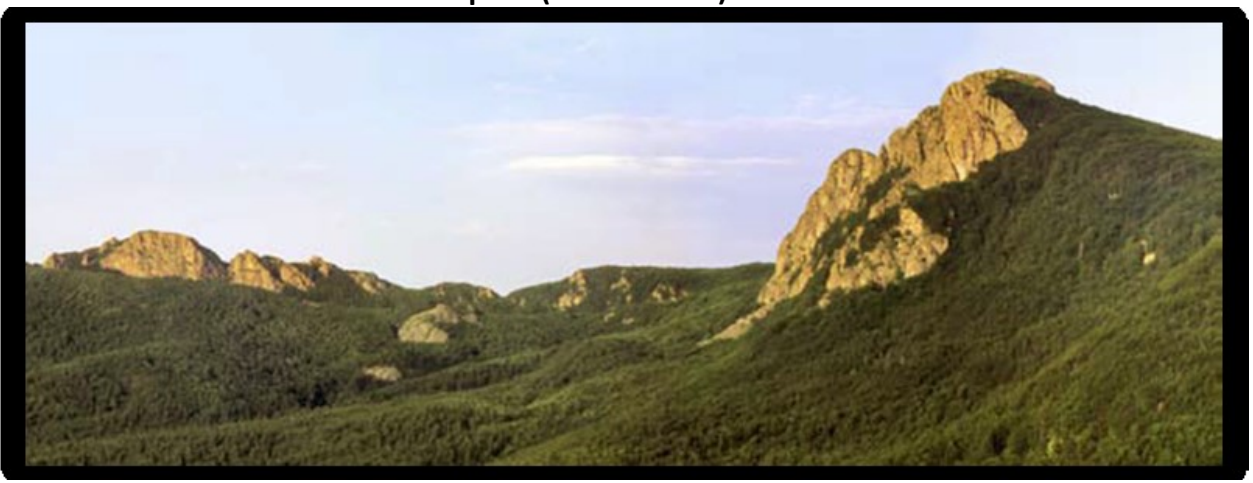
STOP N°4 – PENNA MOUNTAIN (SPRINGS)

ECOLOGY: Shrub associations with *Pinus mugo*; Forests of Turkey oak (*Quercus cerris*) and Chestnut (*Castanea sativs*). Holly (*Ilex aquifolium*). Blueberry (*Vaccinium myrtillus*). Juniper (*Iuniperus nana*). Various species typical of Alpine flora or glacial relics: Fringed pink (*Dianthus superbus*), Fern (*Asplenium adulterinum*), Primrose (*Primula marginata*) and many endemisms of ophiolitic rocks.

GDE associated to springs: Bryophites (mosses), lichens, benthic macroalgae, diatoms

Fauna: Water invertebrates, amphibians in wetlands associated to springs

Panoramic view of the Mt. Penna peak (1735 m a.s.l.)

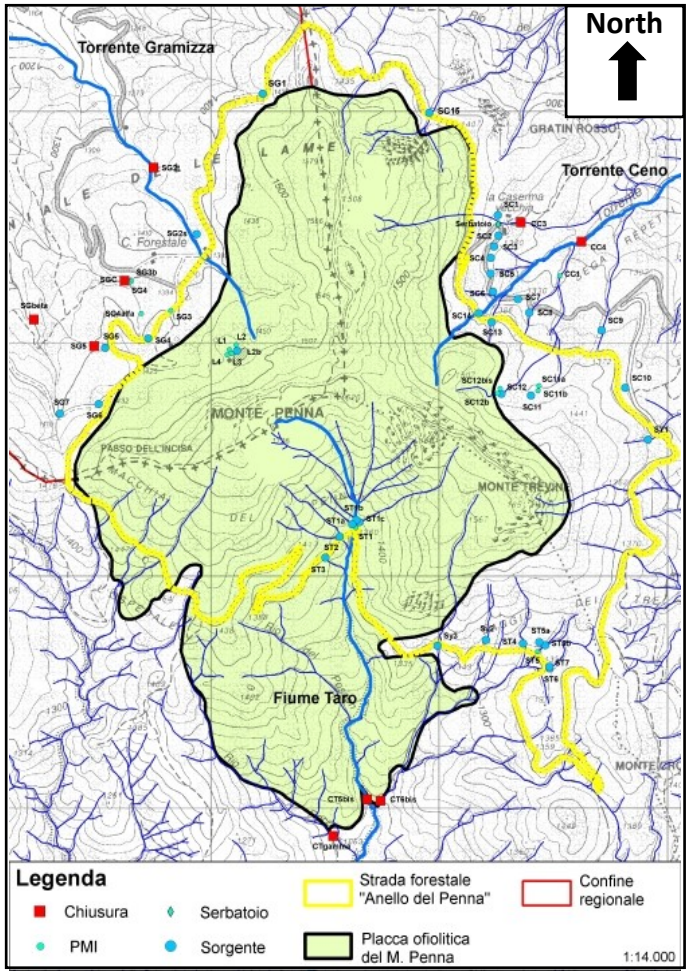


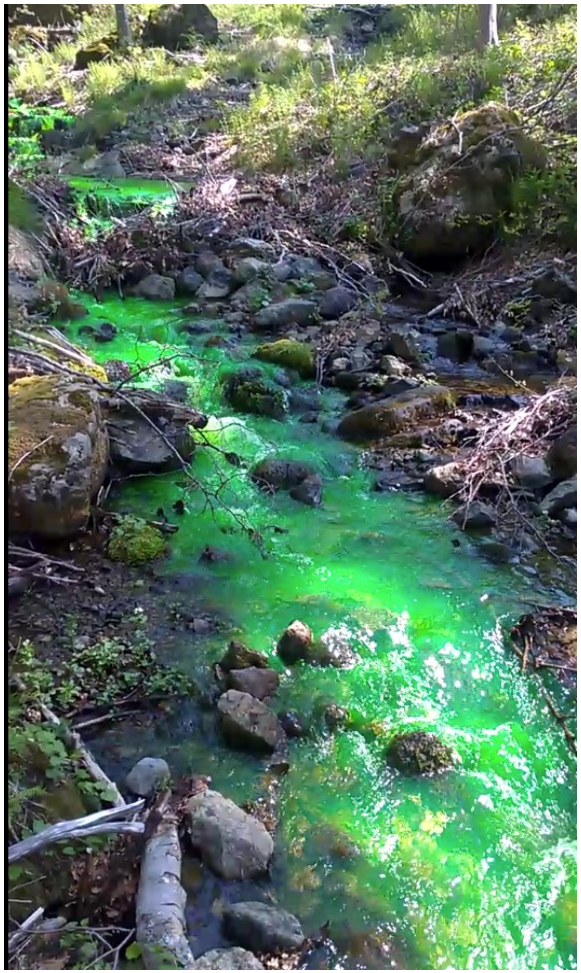
Drosera rotundifolia

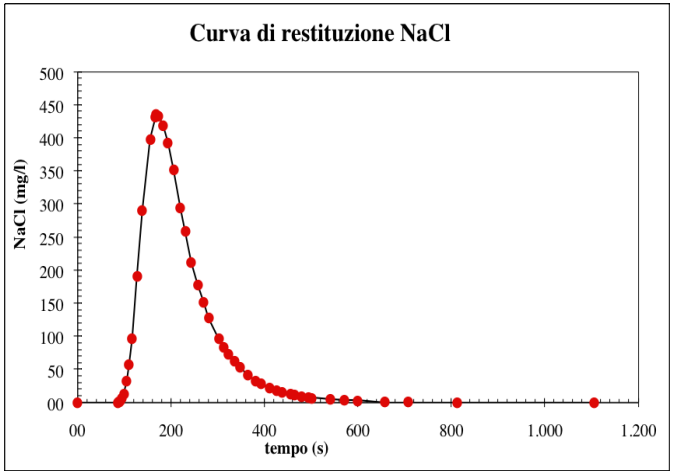
Pillow basalt

STOP N°4 – PENNA MOUNTAIN (SPRINGS)

HYDROGEOLOGY: The springs of Taro river and Ceno river discharge from the ophiolitic aquifer
Rheocrene with lotic environment, hillslope springs
Type C springs (contact between ophiolites and underlying Ligurid clayey formations)
Clear spring water, T°C 5-14, Electrical conductivity 44-150 µS/cm, pH 6,4-7,3







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STOP N°5 – NERO MOUNTAIN-1752 m a.s.l. (SPRINGS)

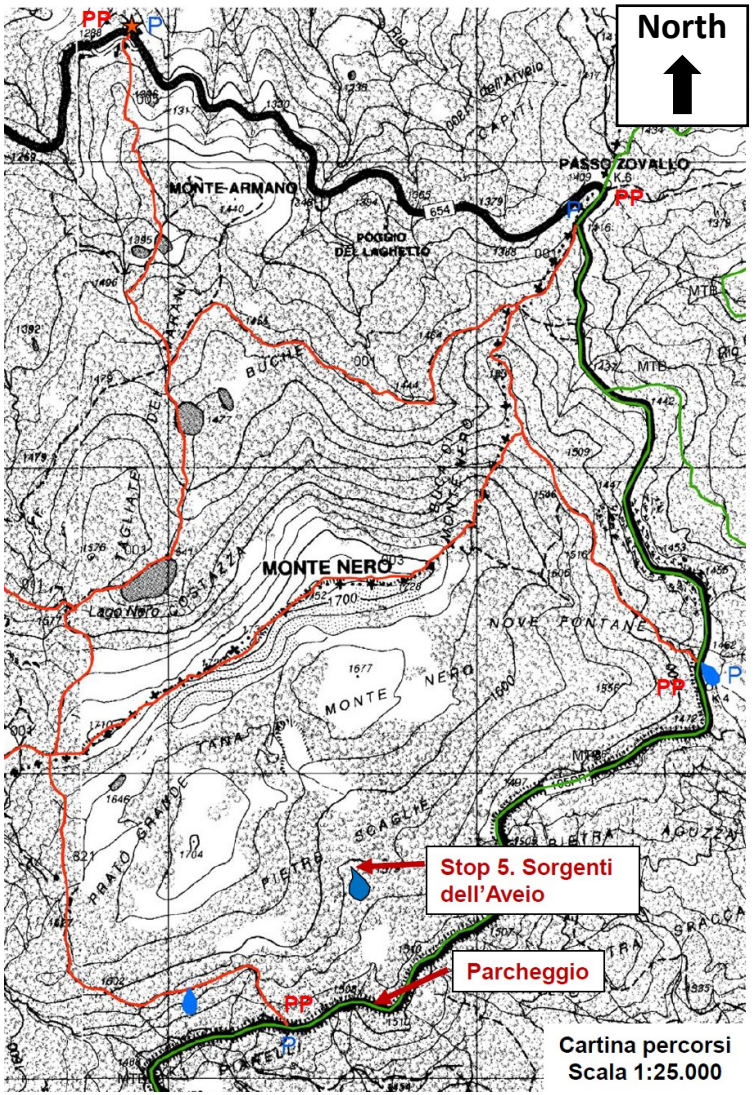
MUNICIPALITIES: Liguria, Bedonia (Parma)

RIVER BASIN: Aveto (Trebbia), Nure, Ceno (Taro) river basin

GEOLOGY: Peridotites, type of intrusive ophiolitic magmatic rocks representing residues of the oceanic crust of an ancient ocean (Tethys) dating back to Jurassic period

Panoramic view of the north side of the Mt. Nero peak (1753 m a.s.l.)

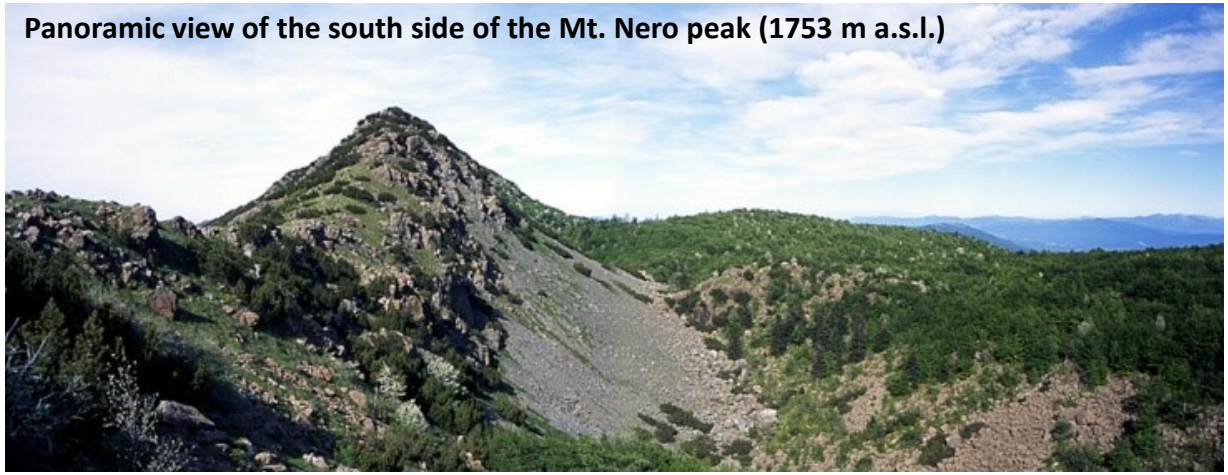
Pinus uncinata



STOP N°5 – NERO MOUNTAIN (SPRINGS)

ECOLOGY: Shrub associations with *Pinus mugo*; Forests of Silver fir (*Abies alba*) and Beech tree (*Fagus silvatica*). Various species typical of Alpine flora or glacial relics: Fringed pink (*Dianthus superbus*), Fern (*Asplenium adulterinum*), Primrose (*Primula marginata*) and many endemisms of ophiolitic rocks.

Fauna: Water invertebrates, amphibians in wetlands associated to springs



Panoramic view of the south side of the Mt. Nero peak (1753 m a.s.l.)

Ichthyosaura alpestris

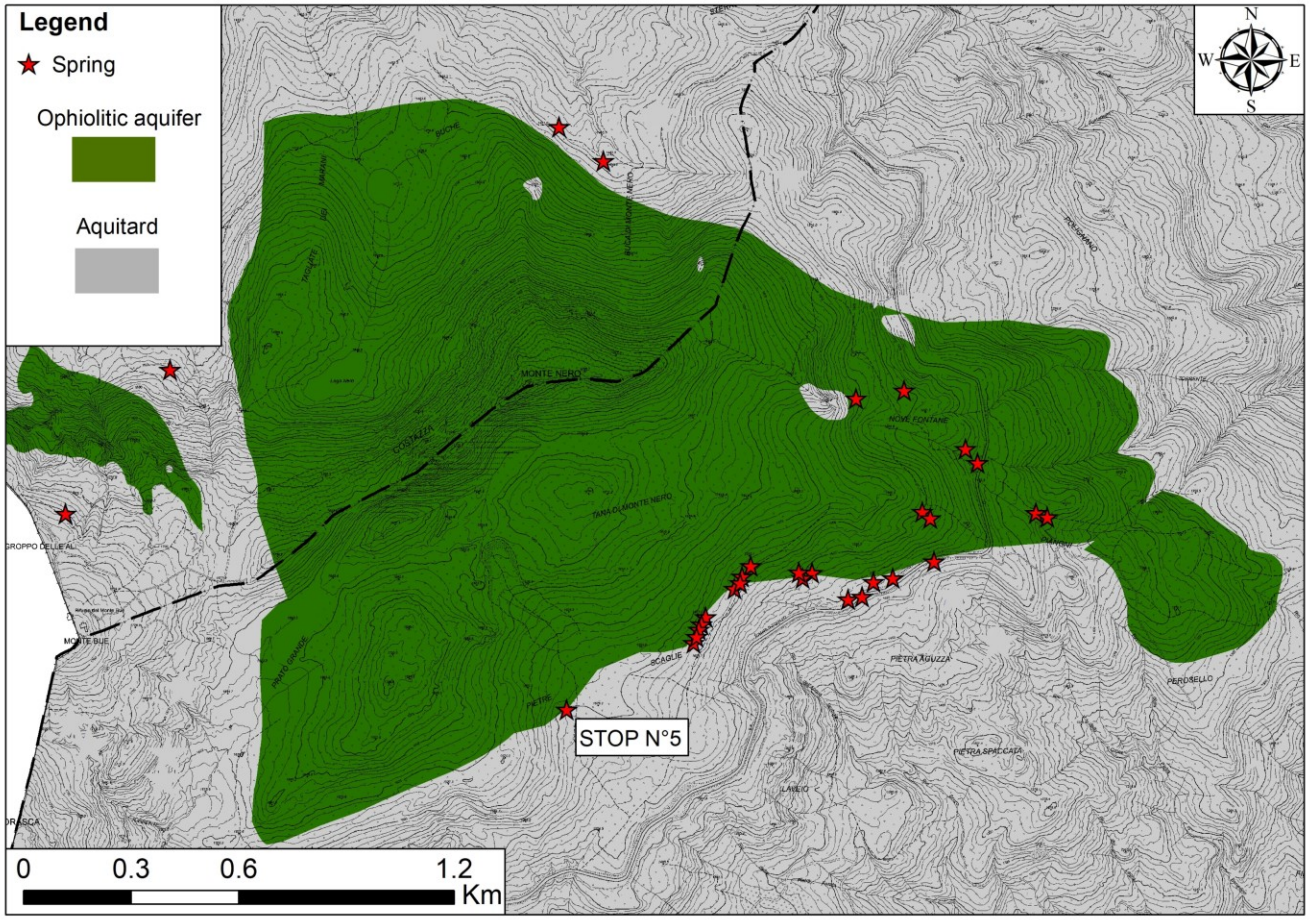
Abies Alba

Dianthus superbus

Primula marginata

STOP N°5 – NERO MOUNTAIN (SPRINGS)

HYDROGEOLOGY: The springs discharge from the ophiolitic aquifer
Rheocrene springs
Type C springs (contact between ophiolites and underlying Ligurid clayey formations)
Clear spring water, T°C 5,8-13,1, Electrical conductivity 115-150 µS/cm, pH 7,1-7,6



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VAUCHERIA
YELLOW GREEN ALGA
(XANTHOPHYTA)
PALUSTRIELLA COMMUTATA
BRYOPHYTE
EUCLADIUM VERTICILLATUM
BRYOPHYTE
OOCARDIUM STRATUM
???
BANGIA ATROPURPUREA
RED ALGA
CLADOPHORA
GREEN ALGA
NEED TO CHECK
SCYTONEMA ?
CYANOBACTERIA