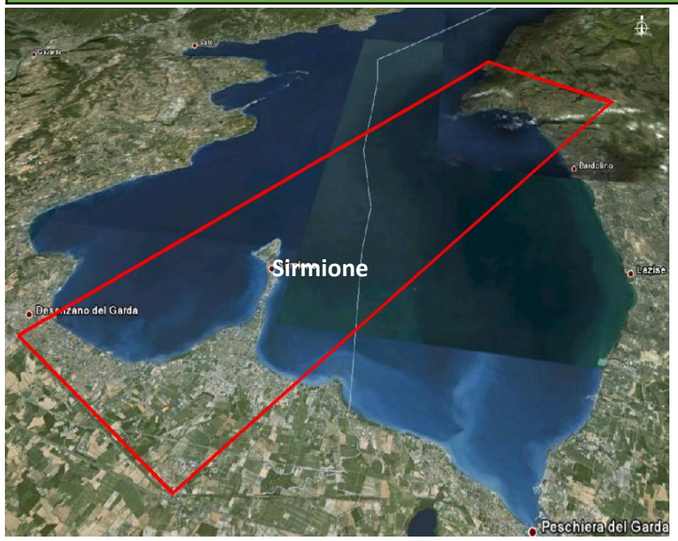
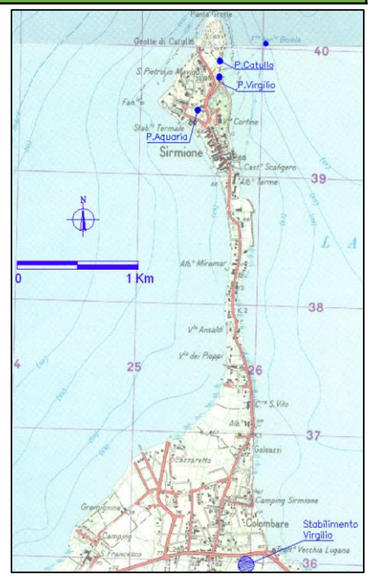
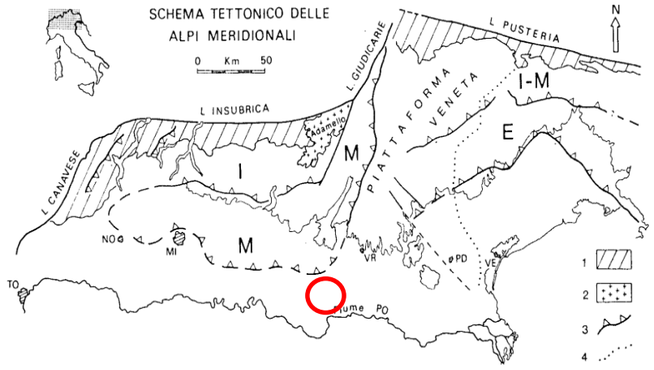
FEATURE OF TECHNICAL SERVICE

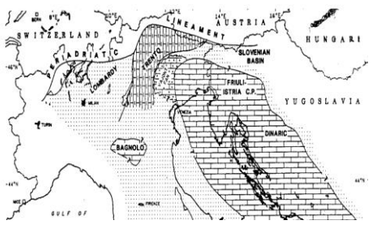
Subject	Studies and research on the Sirmione hydrothermal basin from which the 3 sources Boïola, Catullo and Virgilio draw
Carried out by	SGAI S.r.l. di E. Forlani & C.
Client	TERME E GRANDI ALBERGHI SIRMIONE S.p.A
Service length	2000 - 2010

Framing of the study area

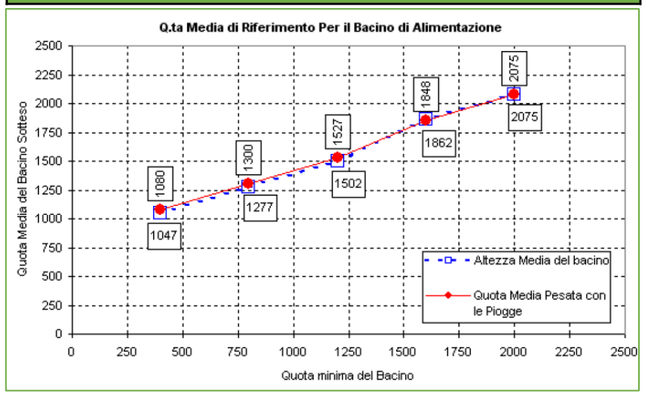




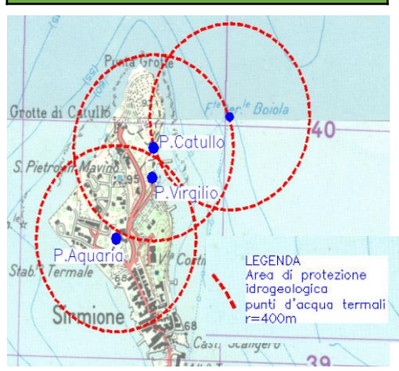




Quote correlation for M. Baldo



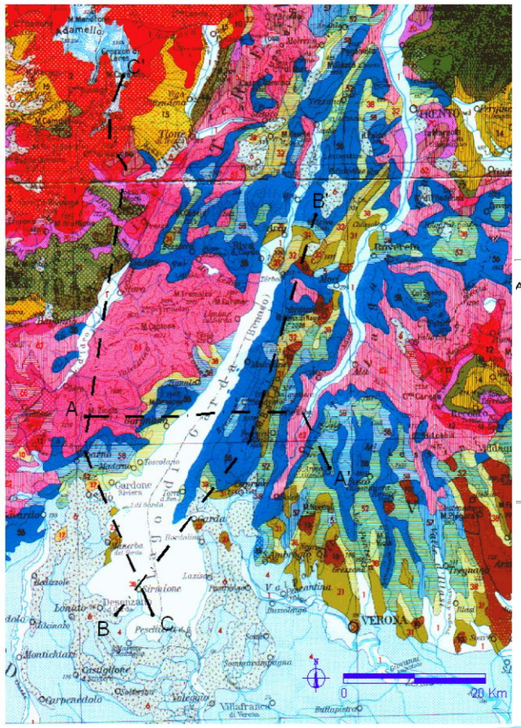
Thermal water points



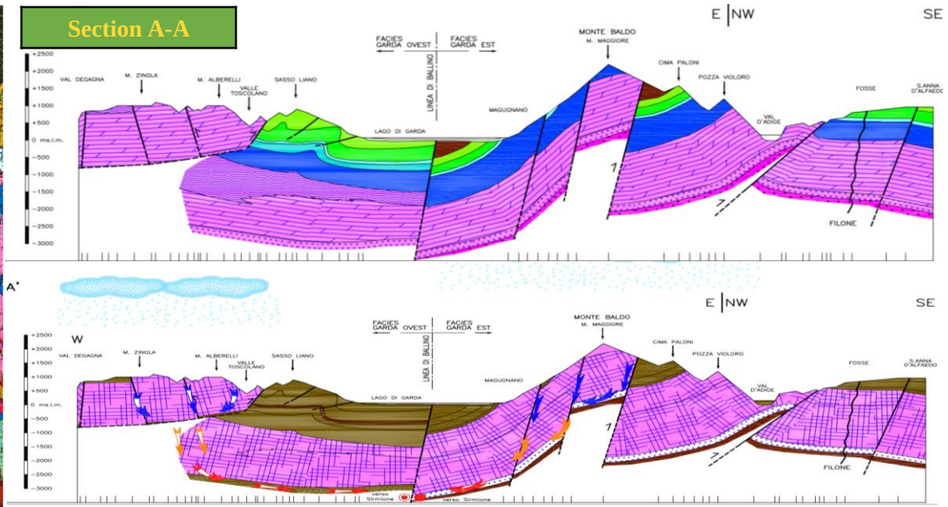
TERME DI SIRMIONE - Hydrological balance of the thermo-mineral aquifer

The purpose of the study carried out was to determine the availability of Sirmione's thermal water and to define a hydrological-hydrogeological balance of the thermo-mineral aquifer from which the 3 sources Boïola, Catullo and Virgilio draw.
The definition of the research program was based on the retrieval, analysis of previous studies and various bibliography concerning geological, geophysical and hydrogeological investigations of the area, in particular the studies already carried out by SGAI in 1977 and the final report in 1981. The study in question has refined the hydrological balance and concerned the definition of a resource management program first, in consideration of a possible increase in production. New and systematic isotope, chemical, geothermal, geological and hydrogeological investigations were defined and carried out. Thanks to the critical comparison with the previous analyzes, a **hydrogeological flow model** has been developed and the reserve and availability of thermal water withdrawal has been estimated in such a way as not to compromise the hydrogeological and hydrochemical balances, essential for keeping intact all the pharmacological and curative characteristics of water.
The chemistry of Sirmione's thermal waters was considered and a temporal analysis was carried out in order to verify the progress of the properties. Thanks to this study and the stratigraphy and geological/hydrogeological analysis the hypothesis on the origin and path of the waters was studied. The geothermal study determined the maximum water temperature and therefore the depth reached. The isotopy was used to trace the geological origin of the sulfur in the water. The origin of the waters was established thanks to the study of the quantities and ratios of various stable and unstable isotopes. The average residence time in the subsoil from the moment of precipitation was defined thanks to the study of Tritium and Carbon 14. The elaboration of the acquired data made it possible to hypothesize different hydrogeological schemes of the thermal waters of Sirmione. Orographic and pluviometric analyzes were performed to deepen the study of the feeding areas relating to the two hypothesized hydrothermal flows (via Adamello and via Baldo). This study made it possible to define the "hypsographic curves" of the surveys analyzed. The analysis continued by studying the permeability of the different rock formations in order to identify the most compatible flow pattern, which turned out to be the one fed by Mount Baldo. Finally, the hydrogeological basin affected by the thermal waters, its minimum resource capacity and the outflow rates were identified thanks to the data collected and the analyzes carried out.

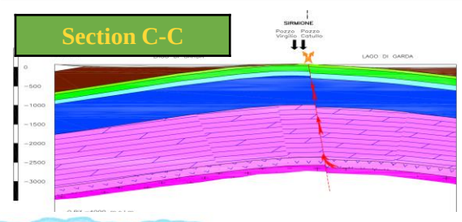
Geological and hydrogeological map and sections



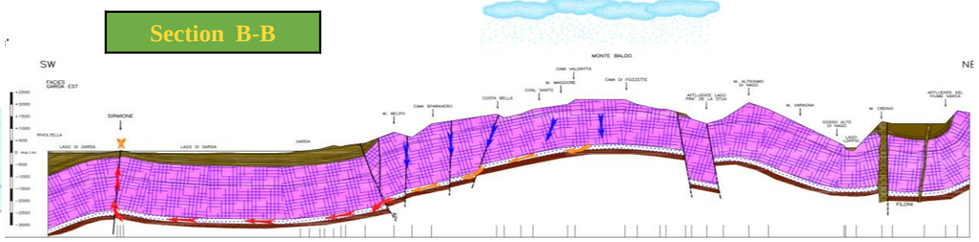
Section A-A

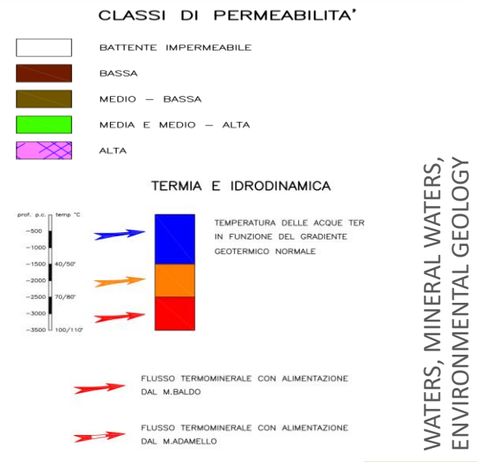


Section C-C



Section B-B





WATERS, MINERAL WATERS, ENVIRONMENTAL GEOLOGY