

A Preliminary Analysis for Understanding Variations in Mountain Springs' Water Availability under Climate Change in Aosta Valley

*Original*

A Preliminary Analysis for Understanding Variations in Mountain Springs' Water Availability under Climate Change in Aosta Valley / Gizzi, M.; Mondani, M.; Taddia, G.. - ELETTRONICO. - CONGRESSO SGI-SIMP Abstract Book:(2022), pp. 954-954. ( CONGRESSO SGI-SIMP 2022 - GEOSCIENCES FOR A SUSTAINABLE FUTURE Torino (Ita) 19 - 21 Settembre 2022) [10.3301/ABSGI.2022.02].

*Availability:*

This version is available at: 11583/2972362 since: 2024-09-19T16:06:46Z

*Publisher:*

Società Geologica Italiana

*Published*

DOI:10.3301/ABSGI.2022.02

*Terms of use:*

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)



Torino 19-21 September 2022

# ABSTRACT BOOK

a cura della Società Geologica Italiana



GEOSCIENCES FOR  
A SUSTAINABLE FUTURE



*PRESIDENTS OF THE CONGRESS*

Rodolfo Carosi and Daniele Castelli.

*SCIENTIFIC COMMITTEE*

Germana Barone, Fabrizio Berra, Matteo Berti, Fernando Camara, Piergilio Cappelletti, Claudio Chiarabba, Rita Chirico, Renato Colucci, Chiara D'Ambrogi, Rosanna De Rosa, Laura De Santis, Daniela Ducci, Patrizia Fumagalli, Biagio Giaccio, Fausto Guzzetti, Giulia Innamorati, Ilaria Mazzini, Mimmo Palano, Claudia Piromallo, Mario Soldati, Stefania Venturi, Andrea Zanchi.

*ORGANISING COMMITTEE*

Donato Belmonte, Sabrina Bonetto, Bernardo Carmina, Francesco Dela Pierre, Evdokia Tema, Lorenza Fascio, Salvatore Iaccarino, Andrea Maffei, Nadia Malaspina, Chiara Montomoli, Marcello Natalicchio, Alessandro Petrocchia, Fabio Massimo Petti, Fabrizio Piana, Franco Rolfo, Licia Santoro, Mario Tribaudino, Alessandro Zuccari.

*ABSTRACT BOOK EDITORS*

Bernardo Carmina, Lorenza Fascio, Giulia Innamorati, Marco Pasero & Fabio Massimo Petti.

*COVER IMAGE:*

Aerial cityscape image of Turin during sunset.

*Papers, data, figures, maps and any other material published are covered by the copyright own by the **Società Geologica Italiana**.*

***DISCLAIMER: The Società Geologica Italiana, the Editors are not responsible for the ideas, opinions, and contents of the papers published; the authors of each paper are responsible for the ideas opinions and contents published.***

***La Società Geologica Italiana, i curatori scientifici non sono responsabili delle opinioni espresse e delle affermazioni pubblicate negli articoli: l'autore/i è/sono illi sololi responsabile/i.***

## **A Preliminary Analysis for Understanding Variations in Mountain Springs' Water Availability under Climate Change in Aosta Valley**

Gizzi M.\*, Mondani M. & Taddia G.

Dipartimento di Ingegneria dell'Ambiente, del Territorio e delle Infrastrutture, Politecnico di Torino.

Corresponding author e-mail: [martina.gizzi@polito.it](mailto:martina.gizzi@polito.it)

*Keywords:* hydrogeology, groundwater monitoring, mountain spring.

The availability of freshwater resources in alpine mountain areas has been affected by the impacts of climate change on groundwater storage mechanisms. A web of complex interactions characterizes climate systems, and several potential effects of climate change in such areas remain largely unknown. Therefore, examining how groundwater storage mechanisms are changing in response to climate-driven agents is becoming increasingly crucial.

To comprehend the existing relationship between changes in weather conditions and water availability in the Aosta Valley region (Northwestern Italy) and how their trends have changed over the last decade, a 7-year discharge series of different Aosta Valley springs (Promise, Alpe Perrot, Promiod, Cheserod) and precipitation data of the related meteorological stations (Aymaville-Viayes, La Thuile-Villaret, Champdepraz, Sant Vincent) were analyzed. The extent of the correlations between springs discharge measurements and hydro-meteorological data was investigated. Besides, precipitation and flow rate trend analyses using the Mann-Kendall and Sen's slope trend detection tests were performed. The Aymaville-Viayes, La Thuile-Villaret, Champdepraz, and Sant Vincent meteorological stations revealed an overall decreasing trend in annual rainfall (mm), with a slight increase in intensity (mm/day) as a result of the reduction in rainfall events (number of rainy days). Nonetheless, based on the analysis of flow rate data relating to the associated springs, Alpe Perrot, Cheserod, and Promise show an overall increasing trend of discharge over time. Although the Cheserod and Promise springs were not found to be highly correlated with rainfall, their aquifers appear to positively respond to the modified climate conditions, increasing the amount of groundwater stored. The moderate correlation values of these two springs can be a consequence of several factors such as aquifer features, distance from the weather station, and solid precipitation amounts that supply water in the following hydrogeological year.

Being able to continuously monitor the effects induced by changed climatic conditions on water reserves through simplified analysis approaches such as those presented in this paper is increasingly necessary. Moreover, implementing future studies through in-depth analyses of soil infiltration, groundwater recharge and storage mechanisms are required to predict the mountain aquifers' behavior in changing climatic conditions.