EMS Annual Meeting Abstracts
Vol. 15, EMS2018-408, 2018

Resilience of small glaciers to global warming due to increased winter precipitation in the southeastern Alps

Renato R. Colucci (1,2), Eleonora Maset (3,4), and Csaba Torma (5)

(1) CNR - ISMAR, Dept. of Earth System Sciences and Environmental Technology, Basovizza (TS), Italy (r.colucci@ts.ismar.cnr.it), (2) UMFVG, Meteorological Society of Friuli Venezia Giulia - Italy, (3) Polytechnic Department of Engineering and Architecture, University of Udine, Italy, (4) Helica s.r.l., Amaro (Udine), Italy, (5) Department of Meteorology, Eötvös Loránd University and MTA Post-Doctoral Research Program, Budapest, Hungary

The southeastern alpine chain shows Mean Annual Precipitation (MAP) up to 3300 mm w.e, representing one of the highest for the Alps. MAP also influences the winter snow accumulation which is of about 7 m at 1800 m a.s.l., averaged over the period 1972-2017. Small glaciers and ice/firn patches, often fed by snow drifting and avalanches, are still present at rather low altitude, between 1830 and 2340 m a.s.l. Mountain glaciers are widely considered important indicators of climate change and in maritime areas with a large MAP amount the glacier sensitivity to global warming is the highest. Little attention has been paid to the influence of extreme events in the short medium term response of such glacial bodies which, though small in size, account for about 10% of the total mass balance of the alpine system. After the dramatic recessional phase occurred between 1986 and 2006, as observed in the majority of the Alps, several winter seasons in the 2000s brought exceptional snow accumulations in the southeastern Alps promoting a positive mass balance in the following years. Results provided by repeated geodetic mass balance measurements obtained by several dedicated airborne laser scanning (LiDAR) surveys performed between 2006 and 2016, account for > 10% increase of ice volume in these 10 years.
Here we analyze the synoptic control at the base of such exceptional snowy winters which seems to be related to the influence and modification of some climate indices due to the ongoing global warming. Although a further warming is expected in the next decades, modification of storm tracks and higher occurrence of extreme events might represent a crucial input in driving the evolution of the small glacial remnants of this alpine sector in the near future