



## Evaluating the effect of climate change on snow load on structures

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### Abstract

As consequence of global warming extreme weather events might become more frequent and severe across the globe. The evaluation of the impact of climate change on extremes is then a crucial issue for the resilience of infrastructures and buildings and is a key challenge for adaptation planning. In this paper, a suitable procedure for the estimation of future trends of climatic actions is presented starting from the output of regional climate models and taking into account the uncertainty in the model itself. In particular, the influence of climate change on ground snow loads is discussed in detail and the typical uncertainty range is determined applying an innovative algorithm for weather generation. Considering different greenhouse gasses emission scenarios, some results are presented for the Italian Mediterranean region proving the ability of the method to define factors of change for climate extremes also allowing a sound estimate of the uncertainty range associated with different models.

**Keywords:** Climate change, Extremes, Reliability, Structural Codes.

### 1. Introduction

The Earth's climate has always changed throughout its history. However, the current warming trend and its consequences are considered of particular significance because many of the observed changes are unprecedented over decades to centuries [1].

Climate change potentially affects all regions of the world by alteration of natural processes, modification of precipitation patterns, melting of glaciers, rise of sea levels, etc. Changes in many extreme weather and climate events have been observed since about 1950 as reported in and confidence has increased that extremes will

become more frequent, more widespread and/or more intense during the 21st century [1].

Indeed, whatever the warming scenarios and the level of success of mitigation policies, it is expected that the impact of climate change will increase in the coming decades because of the delayed impacts of past and current greenhouse gas emissions. Then, unavoidable climate change effects need to be considered, taking into account its economic, environmental and social consequences. The response of the European Union to climate change is an adaption strategy to enhance the capacity to withstand it and the readiness to respond to its impacts, particularly in most vulnerable key sectors like infrastructures