Connected urban green spaces for pluvial flood risk reduction in the Metropolitan area of Milan

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Rethinking cities in a more sustainable and integrated way is a key opportunity for successful climate change adaptation and mitigation. Nature-based solutions and green infrastructures can help to safeguard urban nature and biodiversity while providing multiple benefits to reduce climate risks and improving human well-being. Nature-based solutions help to mitigate flood risk by regulating storm-water runoff and peak-flow. This paper investigates the effects of nature-based solutions and green infrastructure networks on pluvial flood risk in Milan metropolitan area in terms of direct economic damage to buildings and population exposed. Results show that extended urban green networks can reduce pluvial flood damages (by up to 60%) and the population exposed (up to 50%). For all analysed rainfall intensities, damages to buildings and share of population exposed decrease as green area coverage increases, with slightly higher risk reduction for lower-intensity events. 25% of additional urban green coverage can halve the expected annual damage and reduce by 40% the expected annual population exposed. The applied methodological framework makes it possible to identify priority-action urban areas and hence inform decision-making processes as for where green solutions are most efficient.