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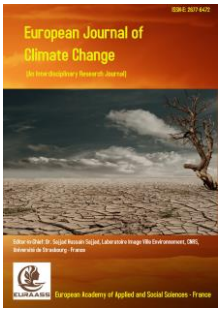

Editorial

Climate Change and European Cities

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The year 1950 has been a tipping point for Europe, as most of the European population became more urban than rural. Since that moment such a transition never stopped, and, projections say that by 2050, the number of urban inhabitants will approximately reach 75% of the total population in Europe, likely imposing further urban sprawl in one of the already most urbanized regions worldwide. As cities are responsible for 75% of the global carbon dioxide emissions, a question about how cities are dealing with climate change raises.

Climate change threatens cities in numerous ways and at different scales. For instance, urbanization entails local increase in urban temperature, compared to the rural environs, known as Urban Heat Island (UHI) effect. Both big and small-sized European cities are experiencing UHI. Previous research shows that in Paris, Rome and Barcelona, the UHI is as high as 8, 5 and 8.2 °C, respectively.

In addition to urban and microscale temperature surges, anthropogenic climate change has amplified the intensity and frequency of mesoscale warming phenomena: heat waves. Particularly relevant have been the heat waves recorded in 2003, 2006, 2007, 2010, 2014, 2015 and 2017. In Europe, from June to August 2003, the heat wave caused about 35000 deaths. In 2018, persistent high temperature anomalies were recorded in Europe, and in particular in Scandinavia and Northern Europe. Most important, estimates show that mesoscale warming phenomena will become more frequent in the coming years.

On top of these warming phenomena, global land-ocean temperatures are continuing increasing in the last decades. In 2017 the global surface temperature resulted being 0.9 °C higher than the average global surface temperature relative to 1951-1980. The increase in global temperature entails the ice cap melting which causes sea level rise. At present, globally, sea level is 89.7 mm (±0.80 mm) higher than in 1993. In particular, in Europe, both northern European countries and Mediterranean ones, have experienced, in the last 45 years a sea level rise ranging from 0.5 to 3 and from 0.5 to 4 mm per year, respectively. Projections show that, in the coming years, both Northern and Southern European countries will be affected by an increase in the sea level ranging from 0.1 to >0.4 m. As sea level is projected to rise in the coming years, coastal cities—which represent 90% of urban areas globally—will likely be threatened by flooding. Without adaptation strategies, the number of people in Europe annually affected by coastal flooding will be about 0.05 - 0.13% of the 27 EU population in 2010. In particular, the Netherlands is ranked among the 20 most exposed countries worldwide to flooding, with potential economic loss of approximately US $1670 billion.

Although climate change is a well-known phenomenon—already in 1988 Dr. James Hansen predicted that the increase in greenhouse gases would have led in 2017 to an increase in global temperature of about 1.03 °C compared to the average temperature

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recorded from 1950 until 1980—the global greenhouse gas emissions continue rising, showing that climate negotiations are either still gridlocked or not sufficient to decrease climate altering emissions.

If, on the one hand international negotiations are slow, on the other hand, cities, especially in the last years, are proactively implementing adaptation and mitigation plans. 66% of the European cities have adopted adaptation or mitigation plans. In the list of the top 5 countries with the highest percentage of cities with mitigation or adaptation plans there are Poland, Germany, Ireland, Finland, and Sweden. However, such plans are compulsory just in a minority of countries (i.e., Denmark, France, Slovakia and the UK).

As international climate change negotiations fail in addressing climate urgency, as demonstrated by COP24 held in Katowice (Poland) on December 2018, cities, which are among the major causes and the main victims of climate change, have demonstrated to own the right political agility to put in place efficient mitigation and adaptation urban plans. However, as isolated actions would not lead to any measurable global effect, just coordinated efforts, harmonized either at upper scales or among municipalities globally, can provide global mitigation benefits.

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