

Impact of Climate Change and Mitigation of Residential Emissions on Future Air Quality in Central-South Chile

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Abstract

Episodes of extreme poor Air quality (AQ) at a given location results from the combination of intense emissions with unfavorable weather, and therefore, the efficiency of mitigation policies can also be affected by changes in climate. Sensitivity studies examining the impact of climate change on AQ have been conducted and revealed that emission control is the main factor driving future AQ rather than climate change. However, climate penalties have been established in future climate and additional reductions in emissions from those expected on present climate conditions are needed to achieve a given air quality standard. Cities in central and southern Chile experience every winter intense pollution events of particulate matter (PM) with exceedances of the National Ambient Air Quality Standards and with severe health impact. Most cities in central-southern Chile have an Air Pollution Management Plan focusing on PM_{2.5} pollution from residential heating based on firewood burning, with this source representing more than 90% of total PM_{2.5} emissions. Climate change studies for central-south Chile suggest a decrease in precipitation and a warmer climate than at present. No comprehensive analysis has been conducted to evaluate the impact of these possible climate scenarios and emission mitigation policies on future AQ in central southern Chile. The goal of this study is to evaluate the impact of climate and emission changes on air quality in central southern Chile (32°S to 47°S) for the 2050s by comparing the recent past with future scenarios. For this purpose, a regional modeling system will be forced with residential emission trajectories and climate simulations (historic and future) from CMIP6. Preliminary results regarding emission trajectories presenting the impact of different policies on emissions will be presented. Additionally, simulations examining the evolution of air quality for the period 2005 – 2014 forced with ER5 and historic CMIP6 will also be presented.

Early Career Scientist

NO, I am not an early career scientist.

IGAC Activities

GEIA: Global Emissions Initiative

IGAC Regional Working Groups

Americas Working Group, Southern Hemisphere Working Group