Fire has a role in eco-system services; naturally produced wildfires are important for the sustainability of many terrestrial biomes and fire is one of nature's primary carbon-cycling mechanisms. Under a warming climate, it is likely that fire frequency and severity will increase. The recent exceptionally intense fire events, such as the Australian Black Saturday fires in 2007 and Russian fires in 2010, highlight the devastation of fires associated with extreme weather. The impacts of emissions from fires on global atmospheric chemistry, and on the atmospheric burden of greenhouse gases and aerosols are recognised although gaps remain in our scientific understanding of the processes involved and the environmental consequences of fires. New sophisticated tools have recently become available (observational and modelling) that provide insight into changing wildfires and intentional biomass burning activity in the anthropocene era that is marked by human’s impact on the Earth.

Currently, fires and their emissions are controlled under fire management and emission reduction schemes. Under future climate conditions, significantly more effective controls on these fires seem necessary. Continued and improved monitoring to support and demonstrate the effectiveness of the adopted measures, and further deepening of knowledge on the mechanistic and sociological factors that influence fires and their environmental impacts is needed. Wildfires and biomass burning are important for a range of international and domestic policies, from air pollution to climate, poverty, security, food supply, and biodiversity. Climate change will make the need to coherently address fires based on scientifically sound measurements and modelling, even more pertinent.