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The importance of atmospheric chemistry research in advancing understanding of weather, climate and air quality and enhancing associated societal services

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Atmospheric composition research plays an important role to society by providing fundamental understanding of the processes that drive changes in atmospheric composition and resulting impacts. An overview of advances in atmospheric composition research and linkages to societal services will be presented. The Global Atmosphere Watch (GAW) Programme of the World Meteorological Organization (celebrating its 30 year anniversary) is one international activity where research is being closely connected with services. The mission of GAW is to: reduce environmental risks to society and meet the requirements of environmental conventions; strengthen capabilities to predict climate, weather and air quality, and contribute to scientific assessments in support of environmental policy. It carries out its mission by maintaining and applying global, long-term observations of the chemical composition and selected physical characteristics of the atmosphere; emphasizing quality assurance and quality control, and delivering integrated products and services of relevance to users.
The GAW mission intrinsically carries the need for complementary and integrative activities regarding measurements, scientific analysis and modeling of the chemical composition of the atmosphere. A critical strategy for the continued advancement of the GAW Programme is the broader use of observations and research activities to underpin and support the development of products and services with high societal impact that rely on information on atmospheric composition and related parameters. Such products and services support the United Nations Agenda 2030 and the Sustainable Development Goals, including climate information, advanced weather forecasting, human health related services, mega-city developments, assessments of impacts on terrestrial and aquatic ecosystems, agricultural productivity, aeronautical operations, renewable energy production and many more.
Meeting the growing need for atmospheric composition information and related services requires increased efforts and focus by the broad atmospheric chemistry community (including IGAC, SPARC and others) directed towards enhancing observing systems to provide the data needed to characterize the current state and trends in atmospheric composition. These data should be better utilized through analysis and accompanied by the efforts in enhanced modeling and improved information management infrastructure. Overall success and sustainability will require stronger efforts towards building collaborations, capacity and communications.
These topics will be expanded on in subsequent session talks and discussions.