



Protecting Human Health in a Changing Climate

Our health is inextricably linked to our environment. Environmental changes related to global climate change, resulting from such phenomena as heat waves, sea level rise, extreme weather events, and changes in precipitation, will significantly impact human health.

Monitoring and predicting such changes on our dynamic planet is a critical element in protecting both human and ecosystem health. The Group on Earth Observations (GEO) [www.earthobservations.org] is a voluntary partnership of governments and international organizations that provides a unique framework for coordinating earth observation efforts, strategies, and investments around the world so that this vital information can inform science and decision makers. These data are necessary for governments and community leaders to prepare populations for the challenges presented by global climate change. Examples of some of the ways in which GEO can facilitate this process are described here.

Vectorborne Diseases

As climate change alters the geographic ranges of certain animal and microbial vectors, diseases such as malaria, dengue, and Lyme disease may expand and shift to new communities that are unaccustomed to managing these diseases, where an unexpected outbreak could be devastating.

GEO's DEMETER methodology integrates seasonal climate forecasts with malaria statistics in an early warning system for malaria outbreaks. This kind of predictive capacity will be useful in assessing whether malaria transmission may spread to new areas. GEO continues to coordinate the integration of satellite and in situ data for the enhancement of vectorborne disease risk maps in affected areas.



Extreme Weather Events

Climate change is expected to increase the frequency and intensity of extreme weather events including floods, droughts, and heat waves. These events can lead to disease and death from events such as outbreaks of waterborne illness after heavy precipitation, food instability caused by drought, and heat stroke and death from extreme temperatures.



GEO's early drought monitoring system is informed by thousands of worldwide rain gauges and numerous satellites that collect data on soil moisture, vegetation, and ground water reserves. Remote sensing of the water cycle and surface conditions may help minimize impacts on human communities by enabling prediction of severe droughts before they occur and interrupt critical food systems.

Sea Level Rise

Sea level rise is already threatening some island nations and coastal zones. Further rise may create climate refugees who would be vulnerable to concomitant mental health stress, interrupted health care, and difficulty obtaining sufficient food and water resources. Many island nations recognize that their communities, their cultures, and even their lives may be at risk from climate change.

GEO held the Workshop on Understanding Sea Level Rise and Variability with more than 100 scientists from 29 countries working together to develop international and interdisciplinary scientific consensus on the observational requirements for addressing sea level rise and variability. This coordinated effort will maximize the use of tide gauges and satellite altimetry to help nations predict and prepare for sea level rise from climate change.



Air Pollution

Climate change has the potential to exacerbate respiratory and cardiovascular diseases such as asthma, chronic bronchitis, heart attack, and stroke by increasing ground level ozone and fine particle concentrations. Children, pregnant women, persons of low socioeconomic status, urban dwellers, and those with preexisting respiratory and cardiovascular disease will be most vulnerable.

GEO's AIRNow monitoring networks provide real-time air quality forecasts across the United States, and are now being demonstrated in China. As ozone and fine particle concentrations increase with climate change, constant monitoring is critical for timely and targeted public health advisories and health response efforts. GEO partner Ozone-Web is a public online site that integrates ground level ozone air quality data with spatial data infrastructure in Europe, allowing similar health warning systems based on real-time data.



Linking earth observation data with health outcome data can play a major role in minimizing human morbidity and mortality associated with climate change. The success of our response to climate change will be enhanced by collaborations between the world's health communities and the Group on Earth Observation through projects that effectively apply observation data to health promotion efforts.

THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS

