Student Discussion Worksheet

Directions for students: By collecting and analyzing a variety of data from distant sites, global monitoring networks can watch for potential threats around the world. The *Science News* article "Radioactive cloud traced to Russia" summarizes how a "network of atmospheric monitoring sites across Europe" detected and tracked a radioactive plume.

This discussion will focus on three global monitoring networks. Read the brief background provided on the three networks and split into groups, with each group focused on one of the networks. Go to the link provided to learn more about the data collection process and answer the data questions with your group. Come together with your class to share observations and answer the three summarizing questions.

Brief overviews of three global monitoring networks

The **Global Seismographic Network** formed in 1986 as a partnership between the United States Geological Survey, the National Science Foundation and the Incorporated Research Institutions for Seismology (a consortium of universities). The network has 150 stations across the globe that detect and record seismic vibrations. Data are collected by seismometers and accessible through the IRIS's Station Monitor app. Learn more about the IRIS's data at www.iris.edu/app/station_monitor/#2019-08-06/LD-SDMD/help-section/

The **Global Ocean Observing System**, or GOOS, was established in 1991 by the Intergovernmental Oceanographic Commission of UNESCO, the United Nations Educational, Scientific and Cultural Organization. The network collects data that impact three main areas: monitoring climate, operational services such as weather forecasts and hazard warnings, and marine ecosystem health. An array of floats with various sensors, called Argo, is one of the sources of data. Lean more about Argo data at www.argo.ucsd.edu/Argo_date_guide.html#gtsusers

The **Global Environment Monitoring System** for freshwater, known as GEMS/Water, began in 1978 as a collaboration between the United Nations Environment Programme, the World Health Organization, the World Meteorological Organization and UNESCO, the United Nations Educational, Scientific and Cultural Organization. In 2014, the United Nations Environment Assembly deemed the GEMS/Water data as integral to achieving the United Nations' Sustainable Development Goals. The system monitors surface water and groundwater quality. Learn more about GEMS/Water data at gemstat.org/about

Data questions for small groups

1. Explore the website provided in the brief overview and give an example of a type of data collected. Don't forget to include the appropriate unit(s) of measurement and how the data is displayed.

2. How do you think this type of data is collected? Is there a physical device in the location or is data collected by a satellite or other remote device?

3. What general information could be gained from analyzing trends in the data? What types of issues could the monitoring system prevent or warn against?

4. What type of science background would be needed to monitor the data?

5. Describe how the data could be used on an international scale.

Summarizing questions for the class

1. What is the purpose of any global network?

2. Why is the international nature of these networks important? How might geopolitical relations or cultural differences affect these types of efforts?

3. Brainstorm a monitoring network that would be useful that isn't included in this list. Do you know if it currently exists? What would be the purpose and benefits of this type of monitoring network?