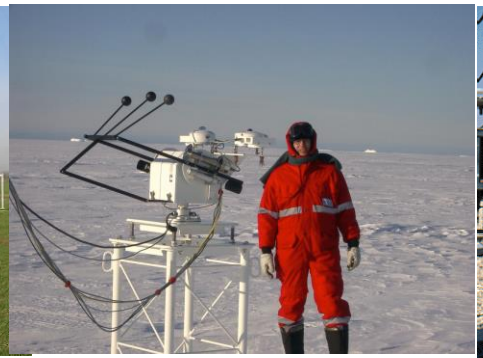
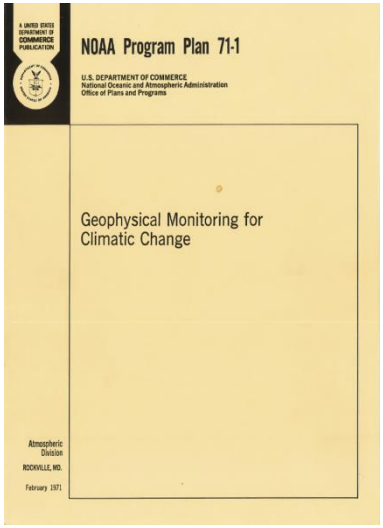
15th BSRN Scientific Review and Workshop

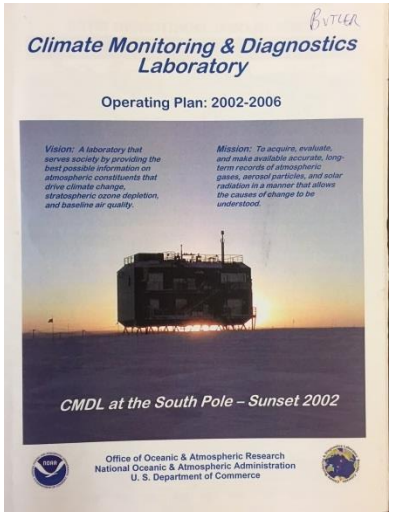
Boulder, Colorado

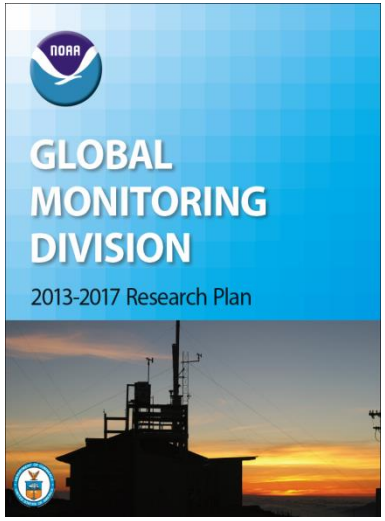
16-20 July 2018

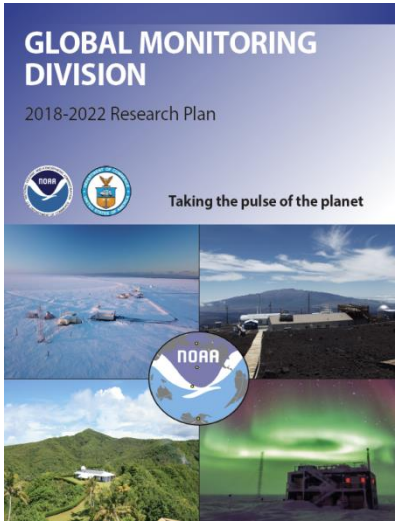



Who is GMD?









GMCC

1970 - 1988

CMDL

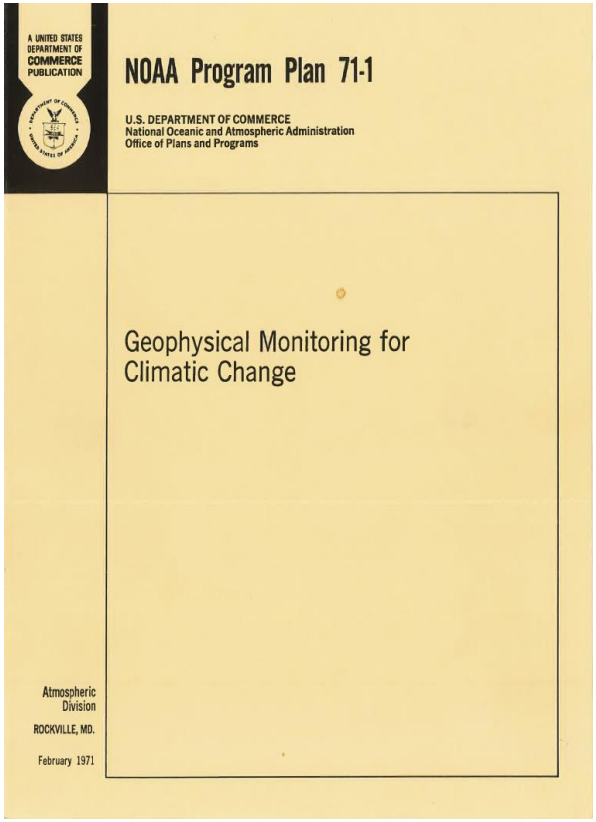
1989 - 2005

ESRL - GMD

2006 - Present

NOAA Program Plan 71-1

"Geophysical Monitoring for Climatic Change"



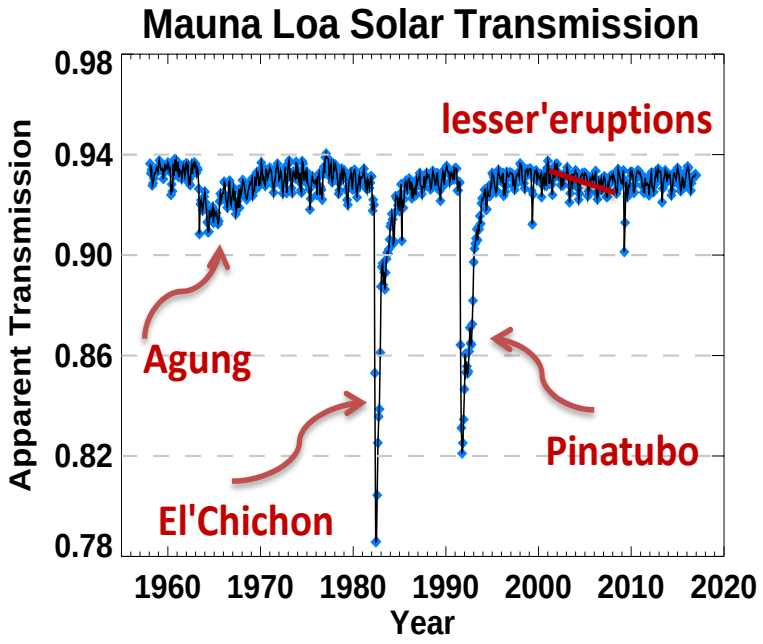
- "This plan, *Geophysical Monitoring for Climatic Change,* is NOAA's program for global monitoring of man's inadvertent modification of weather and climate."
  - *Robert White, Acting Administrator, NOAA*

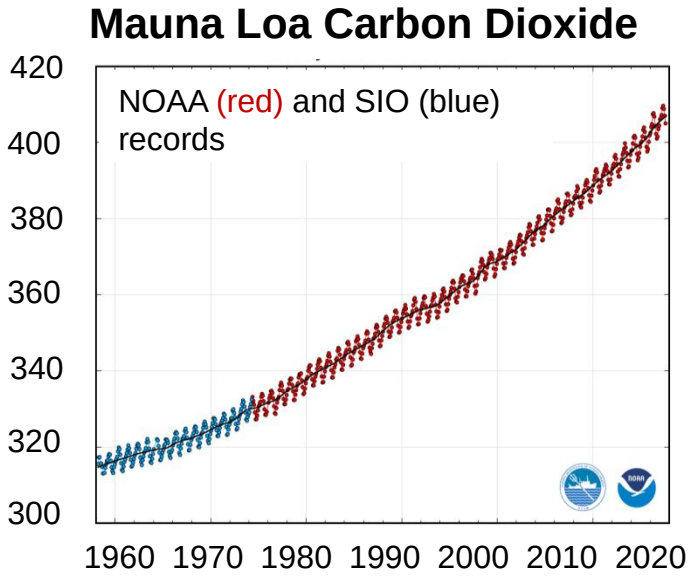
- "Determination of the trends of the climatically important burden of atmospheric contaminants and resolution into natural vs. man-induced sources is essential to the preservation of environmental quality."

GMD Vision and Mission

Vision

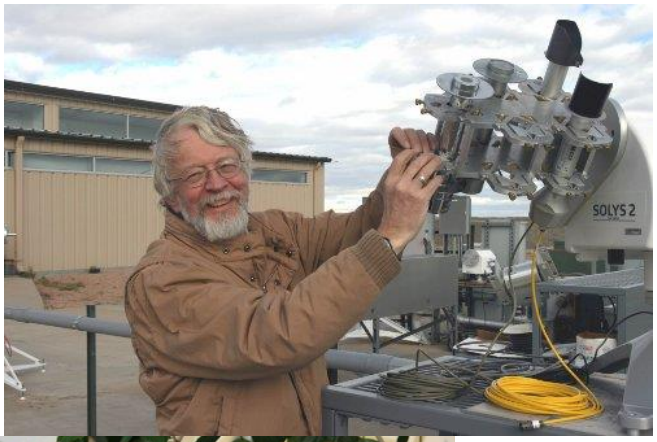
GMD providing and society using the best possible information to inform climate change, weather variability, carbon cycle feedbacks, and ozone depletion





Mission

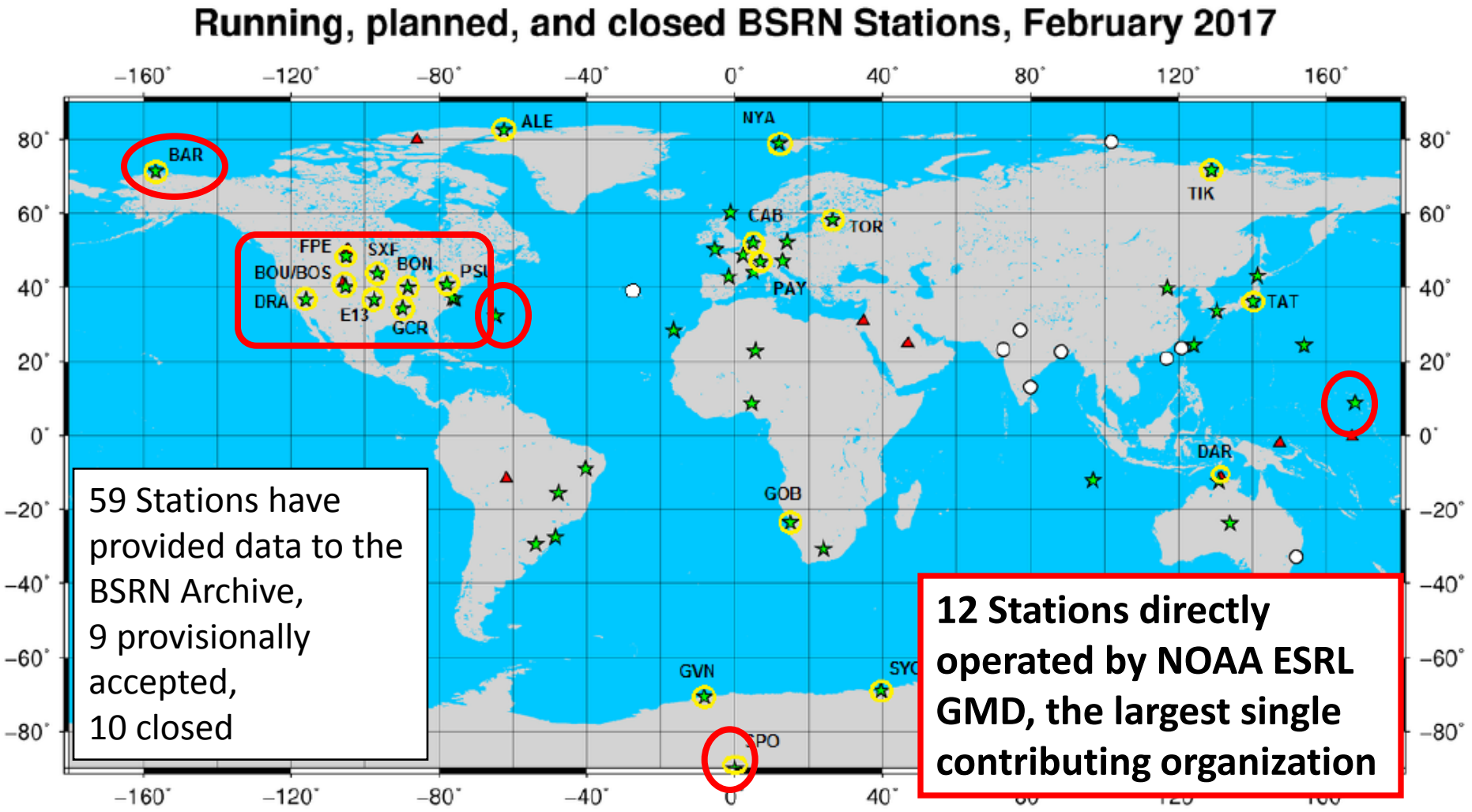
To acquire, evaluate, and make available accurate, long-term records of atmospheric gases, aerosol particles, clouds, and surface radiation in a manner that allows the causes and consequences of change to be understood



GMD and BSRN

- Leadership
  - BSRN Project Manager
  - Several BSRN Working Groups
- Expertise
  - Engineering and design
  - Operations,
  - Calibrations
  - Data file formatting
  - etc.
- Largest contributor of operating stations

Current Stations



ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

GMD Research Themes and Applications

GMD Research Themes and Applications

Radiative Forcing

Renewable Energy Support

Climate Sensitivity

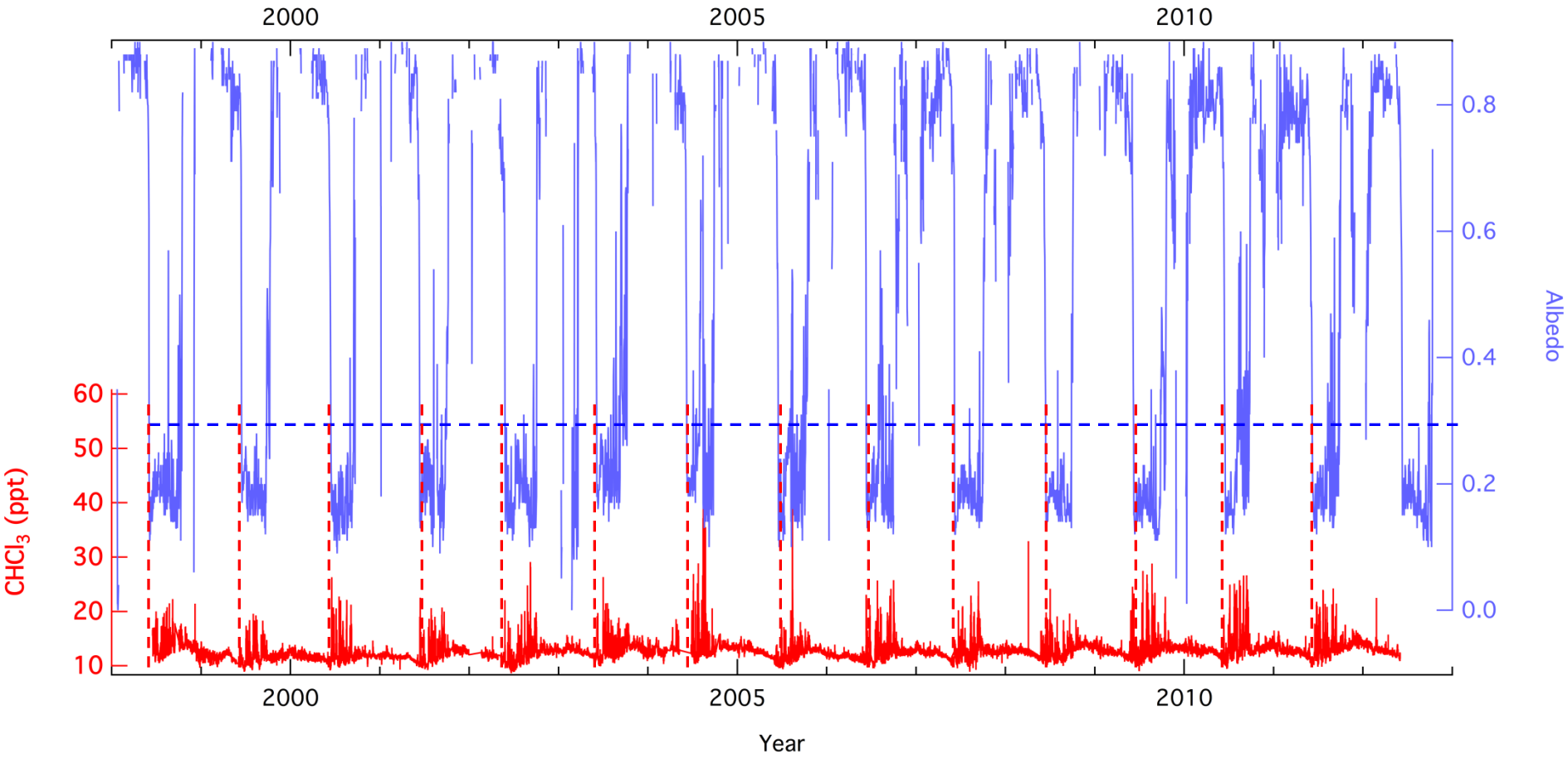
Climate Intervention

Air Quality

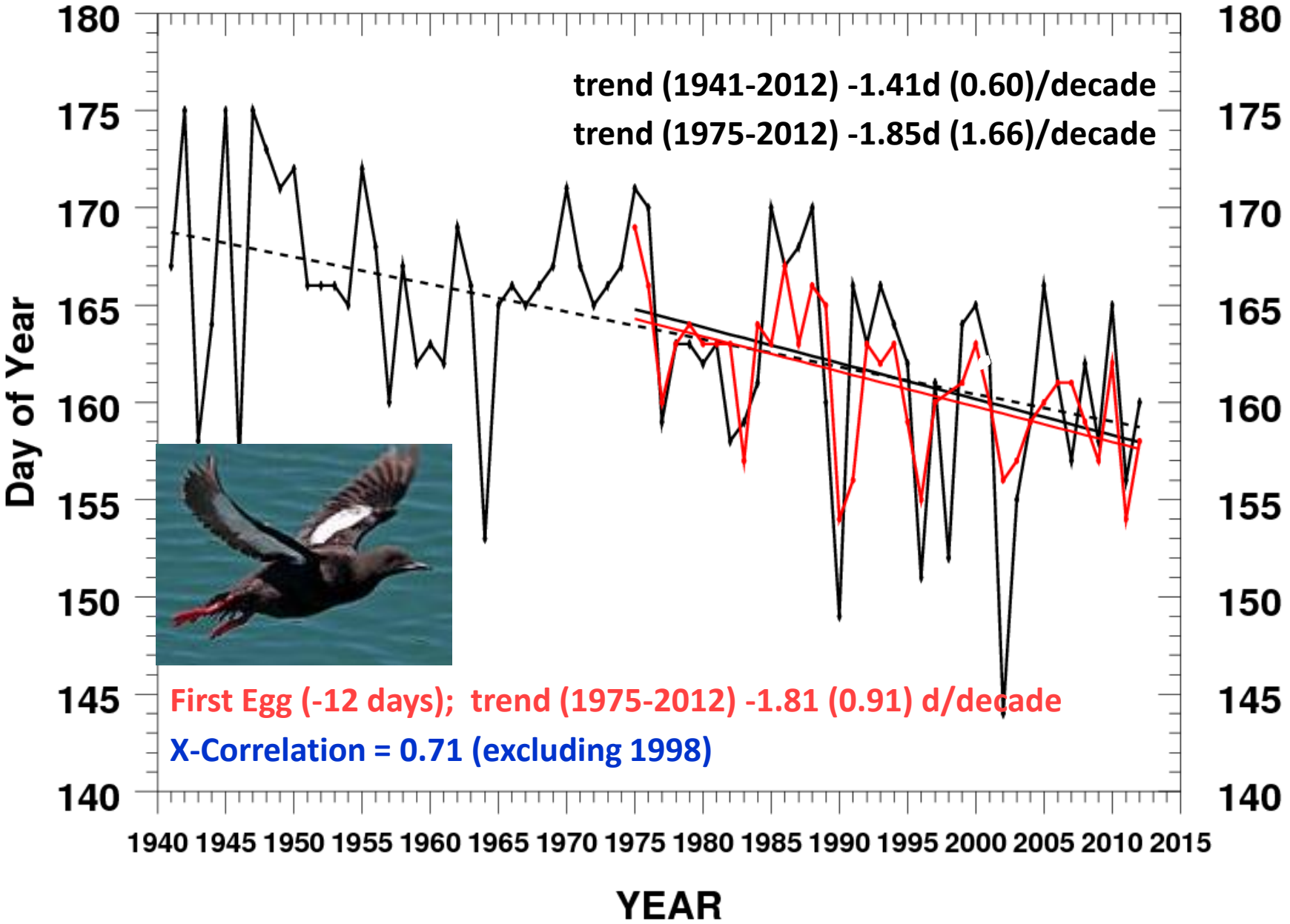
Arctic Processes

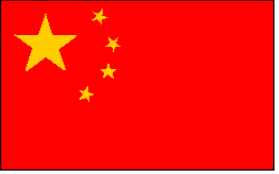
Linkages

- As snow melts, albedo drops
- At albedo < 0.3, $CHCl_3$ is released



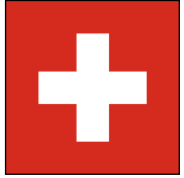
Snowmelt and Guillamot





China

United Kingdom



Switzerland

South Africa

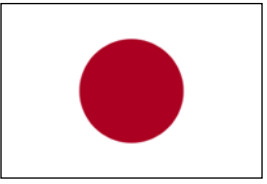
Mexico

Australia

India

United States

Finland



Japan

Germany

Canada

Korea

Welcome to Boulder!

- . . . And an invigorating BSRN Science Review and Workshop!

Backup Slide

Scientific Questions

(Details in Research Plan)

Greenhouse Gases and Carbon Cycle Feedbacks

- ✓ How do oceanic and terrestrial carbon fluxes vary in a changing climate?
- ✓ How spatially and temporally variable are anthropogenic inputs of greenhouse gases?
- ✓ How is upper tropospheric and lower stratospheric water vapor interacting with climate change?

Recovery of Stratospheric Ozone

- ✓ How well is the Montreal Protocol working to reduce ozone depletion?
- ✓ Is stratospheric ozone recovering as expected?
- ✓ How is climate influencing Brewer-Dobson circulation and its feedbacks?
- ✓ How sensitive is the oxidative capacity of the atmosphere and how is it changing over time?

Surface Radiation, Clouds, and Aerosols

- ✓ How does surface radiation vary in space and time?
- ✓ How do climate change and variability work to redistribute clouds ?
- ✓ How do aerosol optical properties vary as a function of location, time, and atmospheric conditions?
- ✓ How does black carbon influence lower atmospheric heating and cloud prevalence?
- ✓ How do changing sky conditions affect ultraviolet radiation at the Earth's surface?
- ✓ How can information on surface radiation improve renewable energy predictions?