

# The Big Picture

Ko Barrett

Deputy Assistant Administrator  
Programs and Administration  
NOAA Oceanic and Atmospheric  
Research

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# Dedication and Perseverance

- Long term records begin with a vision
- Many started in the International Geophysical Year (1957-58)
- All require partnerships and collaborations



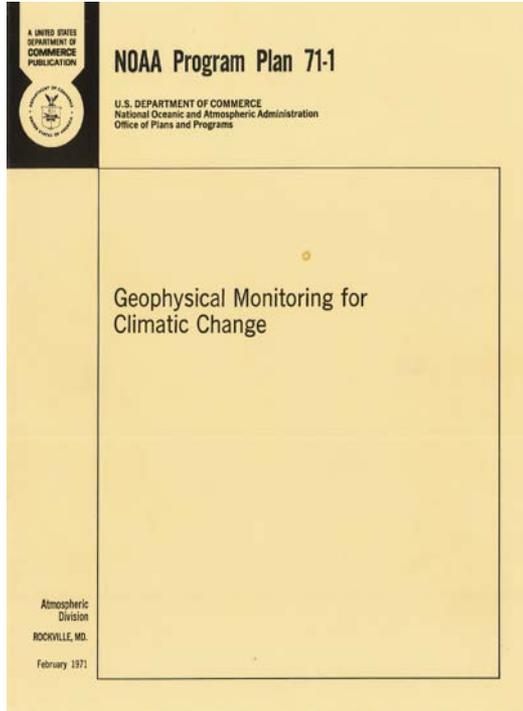
Dave Keeling

John Chin

(Dedication of the Keeling Building, MLO, 1997)

# NOAA Program Plan 71-1

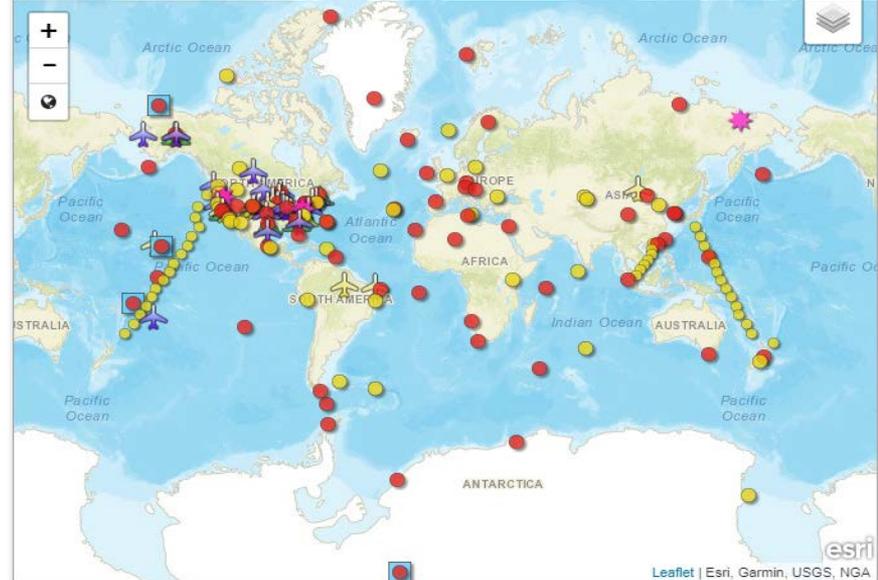
## “Geophysical Monitoring for Climatic Change”



- “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.”

# GHGs 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?



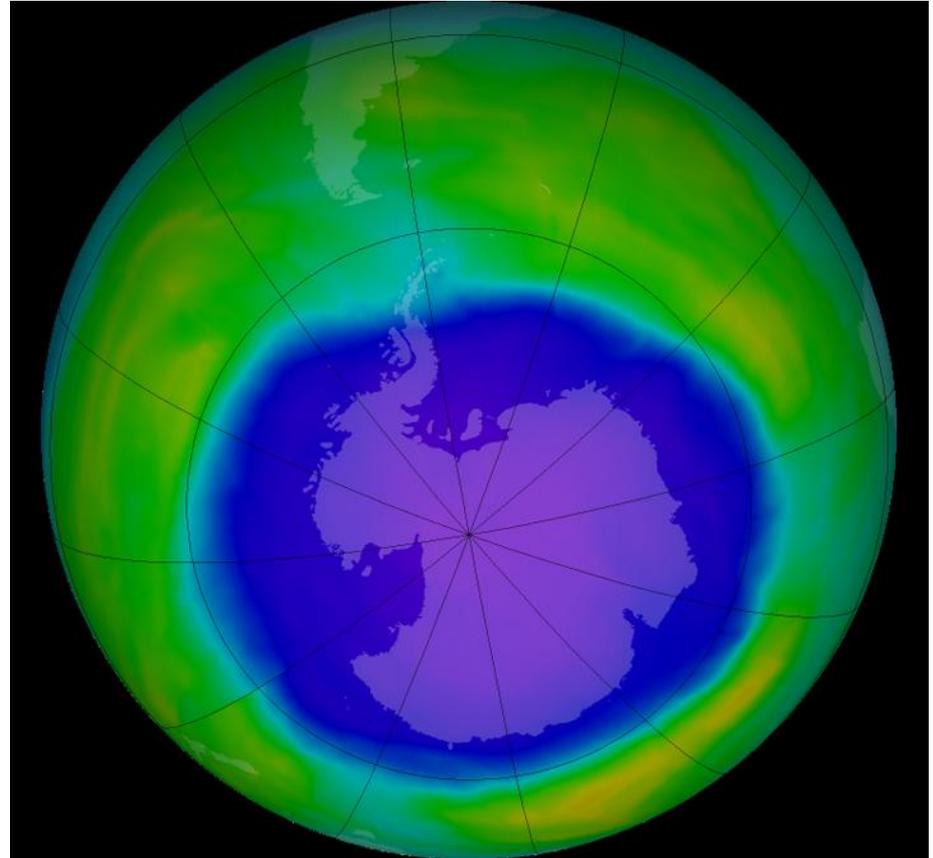
# Surface Radiation, Clouds and Aerosols

- ✓ 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?



# Stratospheric Ozone Recovery

- ✓ 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?





# Supporting Research Infrastructures

- Calibrations
- Quality Control
- Baseline Observatories
- Key Collaborations
  - WMO Global Atmosphere Watch
  - Metrology Institutes (e.g., NIST, BIPM)
  - Research Infrastructures and Agencies (e.g., ICOS, IAGOS, DWD, NASA, DOE, et al.)

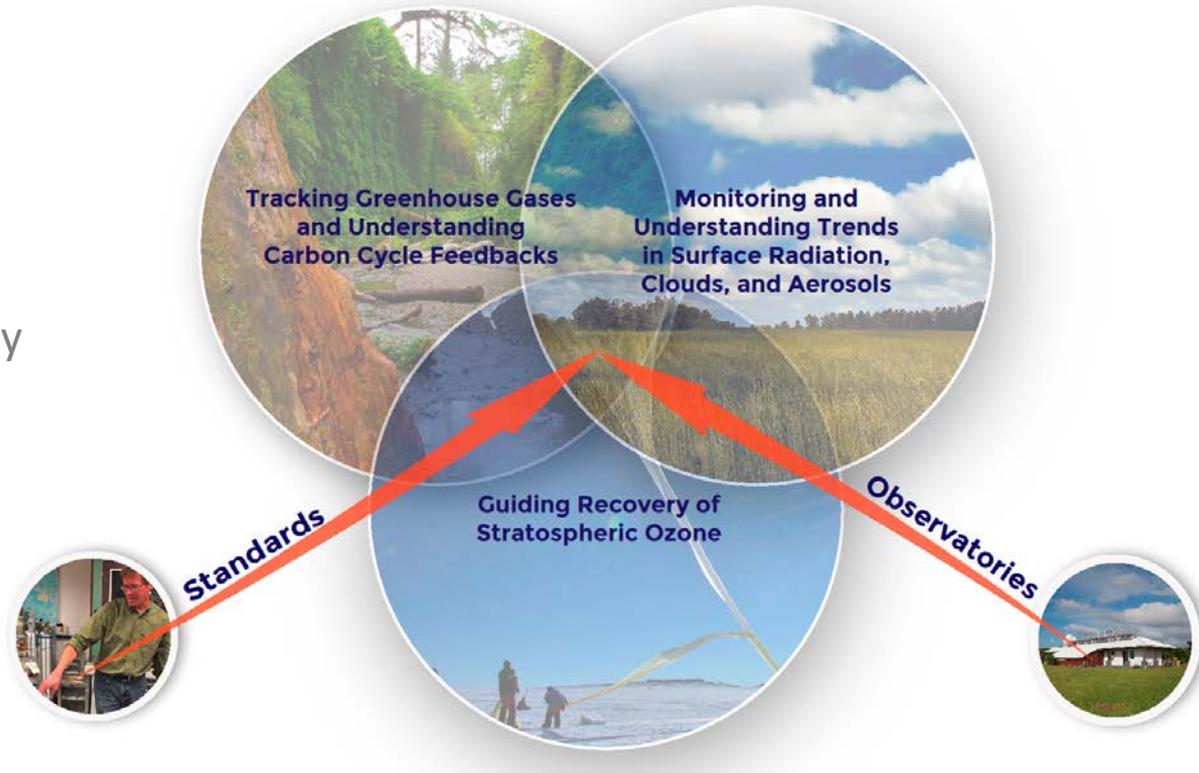
# Many Applications Derive from This Work We All Do Together

Radiative Forcing

Renewable Energy Support

Climate Sensitivity

Climate Intervention



Air Quality

Arctic Processes

Thank You!

