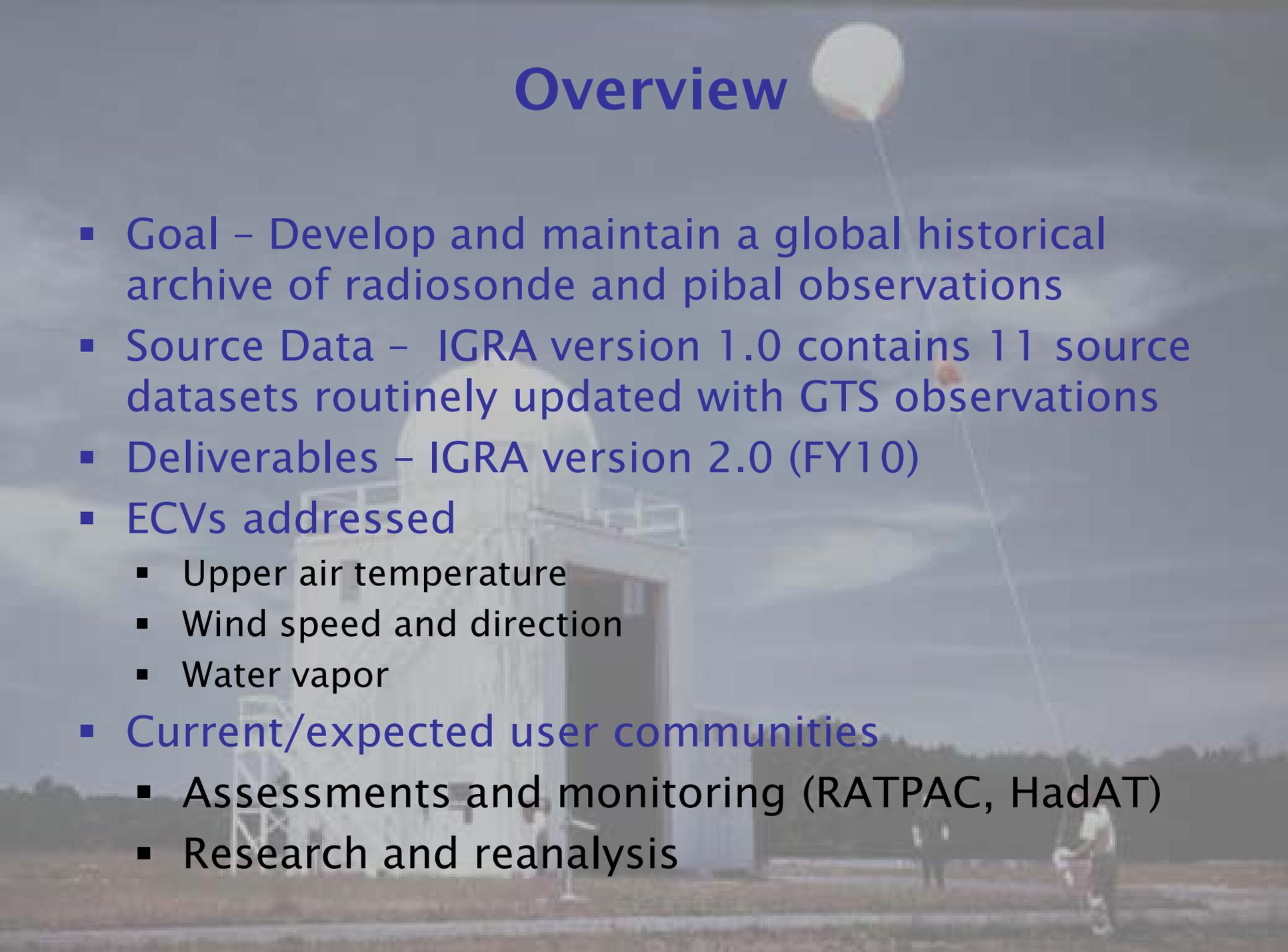




# Integrated Global Radiosonde Archive

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# Overview

The background image shows a weather station with a white dome and a tall tower. A large white balloon is being launched from the station, with a person visible in the distance holding the rope. The sky is overcast.

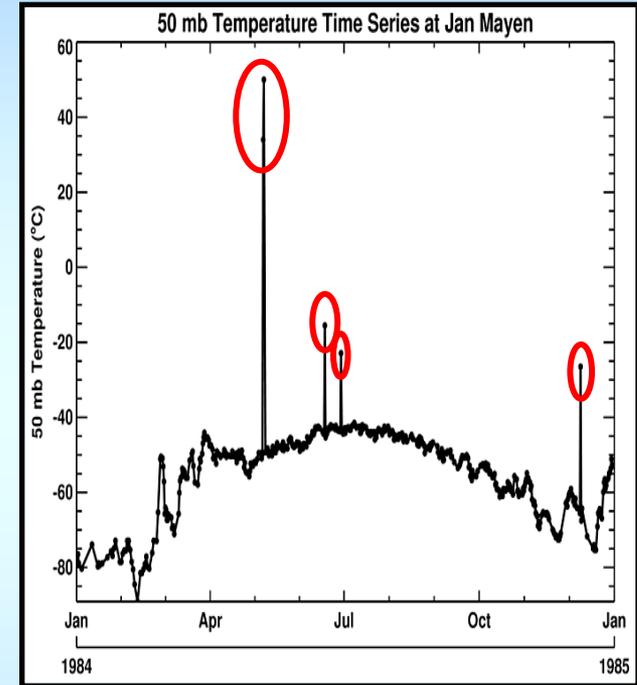
- Goal – Develop and maintain a global historical archive of radiosonde and pibal observations
- Source Data – IGRA version 1.0 contains 11 source datasets routinely updated with GTS observations
- Deliverables – IGRA version 2.0 (FY10)
- ECVs addressed
  - Upper air temperature
  - Wind speed and direction
  - Water vapor
- Current/expected user communities
  - Assessments and monitoring (RATPAC, HadAT)
  - Research and reanalysis

# Approach

- **Acquisition**
  - Contact data centers
  - Exploit personal contacts
- **Preprocessing**
  - Format standardization
  - Fundamental sanity checks
- **Integration**
  - Data comparisons
  - Station selection and merging

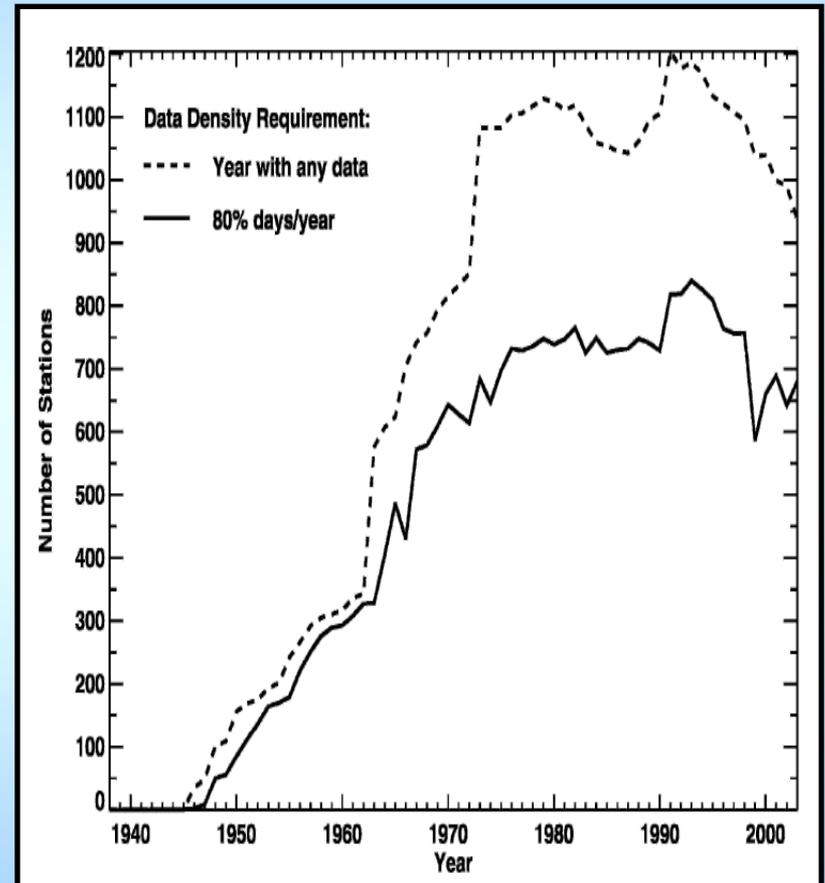
# Approach

- **Quality assurance**
  - Basic plausibility
  - Internal consistency
  - Repetition of values
  - Temporal consistency
  - Vertical consistency
- **Reprocessing**
  - Operational daily updates
  - Annual reprocessing

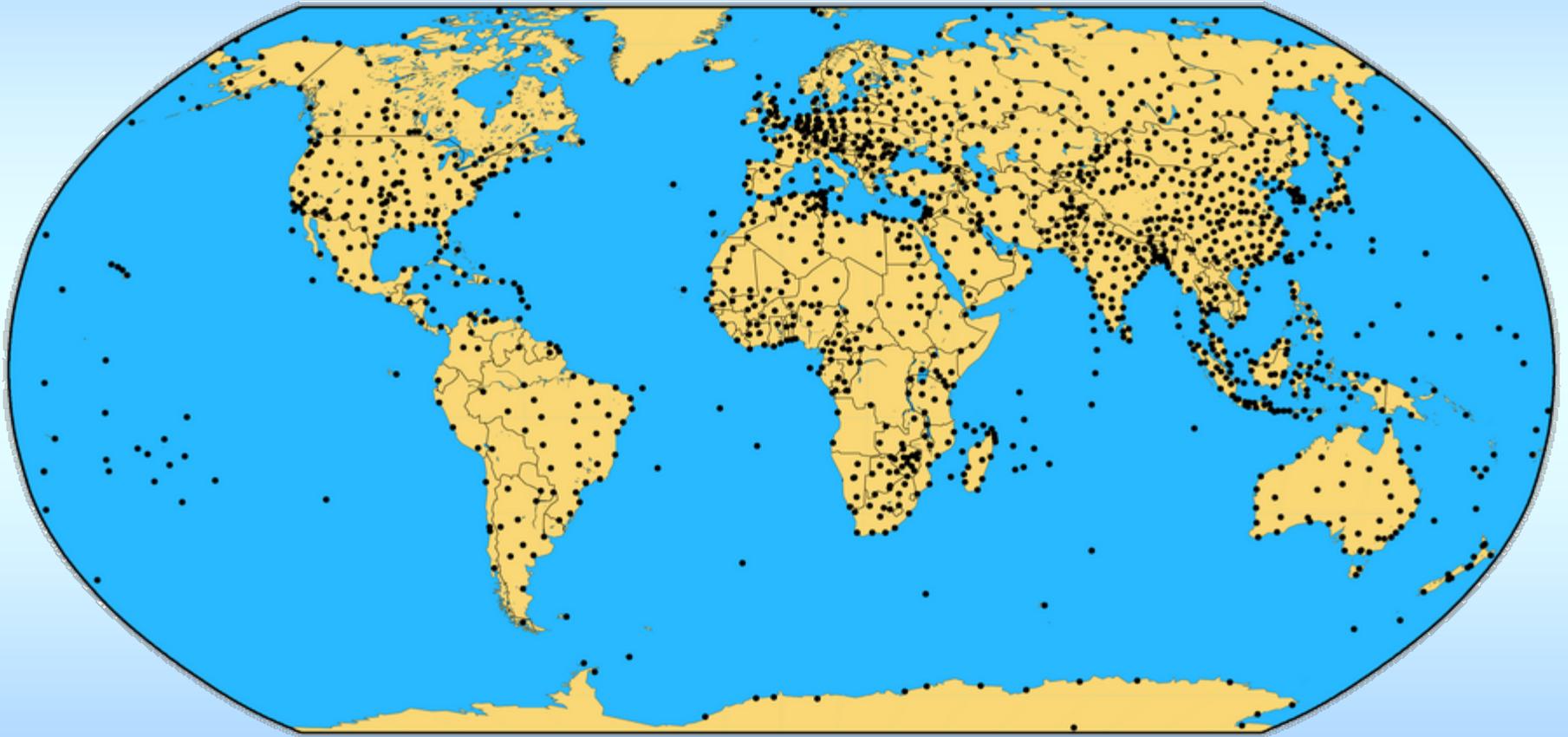


# Accomplishments: IGRA version 1.0

- Released in 2005
- 1536 stations
- $28 \times 10^6$  soundings
- 11 data sources
- 1 daily update
- 2 access points
  - FTP
  - NOMADS



# Accomplishments: IGRA version 1.0



# Accomplishments: IGRA version 1.0

- Durre, I., R.S. Vose, and D.B. Wuertz, 2006: Overview of the Integrated Global Radiosonde Archive. *Journal of Climate*, **19**, 53-68.
- Durre, I., R.S. Vose, and D.B. Wuertz, 2008a: Robust automated quality assurance of radiosonde temperatures. *Journal of Applied Meteorology and Climatology*, **47**, 2081-2095.
- Durre, I. and X. Yin, 2008b: Enhanced radiosonde data for studies of vertical structure. *Bulletin of the American Meteorological Society*, **89**, 1257-1262.

# Validation Strategy/Results

- “As appropriate for the type of project”
- Somewhat relevant: comparison with other global-scale datasets (e.g., Durre et al., 2006)
- Tangentially relevant: validation of quality assurance approach (Durre et al., 2008a)

# Product Maturity: 5 or so

Maturity	Sensor Use	Algorithm stability	Metadata & QA	Documentation	Validation	Public Release	Science & Applications
1	Research Mission	Significant changes likely	Incomplete	Draft ATBD	Minimal	Limited data availability to develop familiarity	Little or none
2	Research Mission	Some changes expected	Research grade (extensive)	ATBD Version 1+	Uncertainty estimated for select locations/times	Data available but of unknown accuracy; caveats required for use.	Limited or ongoing
3	Research Missions	Minimal changes expected	Research grade (extensive); Meets international standards	Public ATBD; Peer-reviewed algorithm and product descriptions	Uncertainty estimated over widely distribute times/location by multiple investigators; Differences understood.	Data available but of unknown accuracy; caveats required for use.	Provisionally used in applications and assessments demonstrating positive value.
4	Operational Mission	Minimal changes expected	Stable, Allows provenance tracking and reproducibility; Meets international standards	Public ATBD; Draft Operational Algorithm Description (OAD); Peer-reviewed algorithm and product descriptions	Uncertainty estimated over widely distribute times/location by multiple investigators; Differences understood.	Data available but of unknown accuracy; caveats required for use.	Provisionally used in applications and assessments demonstrating positive value.
5	All relevant research and operational missions; unified and coherent record demonstrated across different sensors	Stable and reproducible	Stable, Allows provenance tracking and reproducibility; Meeting international standards	Public ATBD, Operational Algorithm Description (OAD) and Validation Plan; Peer-reviewed algorithm, product and validation articles	Consistent uncertainties estimated over most environmental conditions by multiple investigators	Multi-mission record is publicly available with associated uncertainty estimate	Used in various published applications and assessments by different investigators
6	All relevant research and operational missions; unified and coherent record over complete series; record is considered scientifically irrefutable following extensive scrutiny	Stable and reproducible; homogeneous and published error budget	Stable, Allows provenance tracking and reproducibility; Meeting international standards	Product, algorithm, validation, processing and metadata described in peer-reviewed literature	Observation strategy designed to reveal systematic errors through independent cross-checks, open inspection, and continuous interrogation	Multi-mission record is publicly available from Long-Term archive	Used in various published applications and assessments by different investigators

# Issues/Risks & Work- Off Plans

- Primary risk is PI getting hit by a bus
- Uncertainty estimates would be nice

# Schedule: IGRA version 2

- IGRA version 2 currently in development
- ~40 source datasets acquired
- Preprocessing and standardization (Q1)
- Integration (station matching) (Q3)
- QA and update system (Q4)

# Research- to- Operations or Delivery Plan

- Fully operational dataset at NCDC
- Daily processing
  - Updates with soundings from previous day
  - Places updated dataset on FTP
- Monthly processing (5<sup>th</sup> day of month)
  - Computes monthly means and inventories
  - Places monthly means on FTP
  - Sends data to the NCDC Archive
  - Provides inventories to Health of Network

# Resources

- Number of personnel employed for project: Roughly 1 FTE (Durre, Yin, Applequist)
- Key equipment or observatories used: N/A
- Key collaborating projects or personnel
  - NCAR
  - ECMWF
- NOAA points-of-contact
  - Imke Durre and Russell S. Vose, NCDC
- Target NOAA Data Center: NCDC (duh)