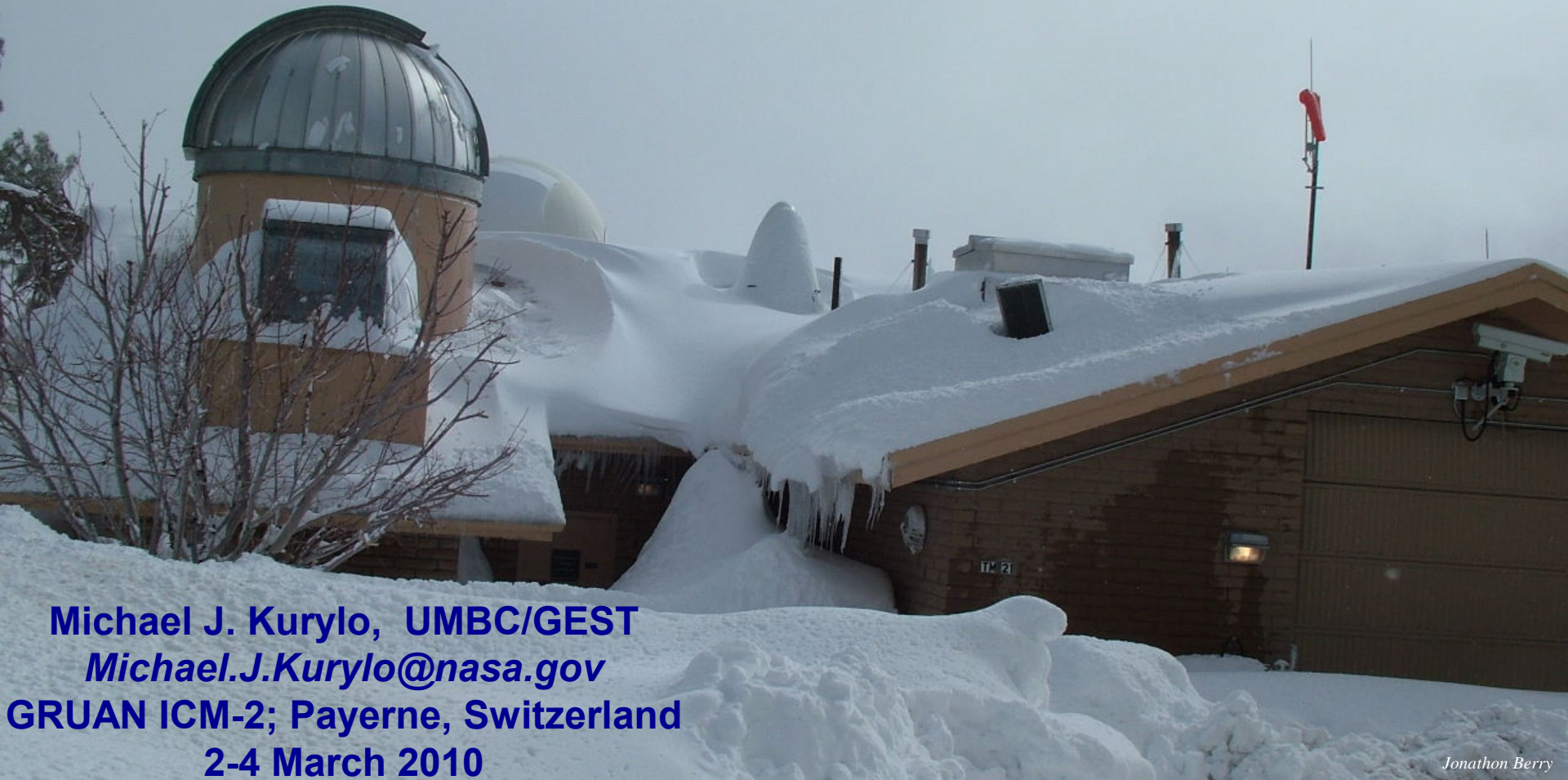


Network for the Detection of Atmospheric Composition Change: *Tracking Changes in the Earth's Atmosphere*

Operational Perspectives Pertinent to GRUAN

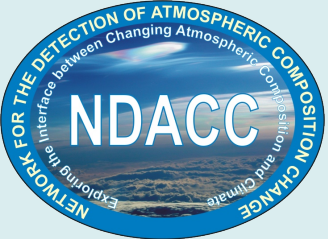


Michael J. Kurylo, UMBC/GEST

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GRUAN ICM-2; Payerne, Switzerland

2-4 March 2010



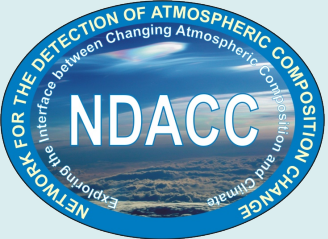
Instrument Working Groups: *Functions*

✧ **Measurement Quality Control**

- *Protocol Development*
 - *Instrument-specific Performance Requirements*
 - *Calibration & Validation*
- *Recommendations on Proposed Affiliations*
- *Intercomparison Campaigns*
 - *Instruments & Algorithms*
 - *Decisions on Common Basis Parameters*
 - *Satellite Cal/Val*

✧ **Data Reporting and Archiving**

- *Adherence to Data Protocol*
- *Archiving Formats*
- *Consistency in Reporting the Same Quantity*
 - *Important in utilizing measurements from existing networks*



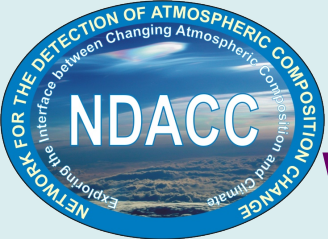
Parameter / Species Working Groups: *Functions*

✧ ***Assess Various Measurement Techniques***

- *Accuracy and Precision*
- *Operating Procedures for Different Sensor Types*
- *Future Potential*
- *Calibration / Validation for Multiple Techniques*
 - *Best practices for data comparison or satellite validation*
- *Retrieval Aspects*
 - *Basis parameter issues*

✧ ***Building a Homogeneous Dataset***

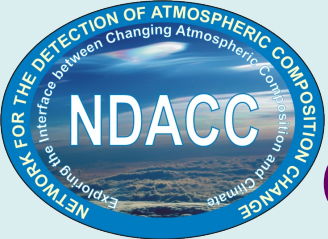
- *Combining and Merging Different Datasets*
- *Development of Trends*



2005: Inception of NDACC Working Group on Water Vapor

✧ ***Aim: Investigate, in detail, various aspects of H_2O measurements***

- *Accuracy of Different Sensor Types*
 - *in situ (balloon and aircraft) – radiosondes, frost point and Lyman- α hygrometers, ...*
 - *remote sensing – FTIR, Raman and DIAL lidars, microwave radiometers, solar and star occultation sensors, ...*
- *Calibration Issues*
- *Spectroscopic Issues*
- *Retrieval Aspects - volume mixing ratios, number density, averaging kernels, altitude resolution, ...*
- *Synergy of Combining and Merging Data Obtained by Different Techniques*
- *Validation and Campaigns*



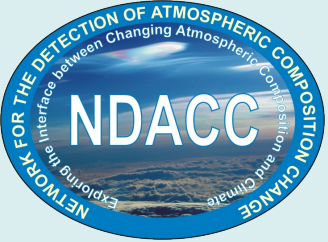
2009: Inception of NDACC Cooperating Network Affiliation

✧ ***Recognition of measurement capabilities developed external to NDACC***

- *Regional, Hemispheric, or Global Networks Operating Independent of NDACC*
 - *Existing quality assurance guidelines*
 - *Existing operational requirements*
 - *Existing data archiving policies*
 - *Existing national or international recognition*
- *Mutual Benefit of Strong Measurement and Scientific Cooperation*

✧ ***Agreements finalized with five networks***

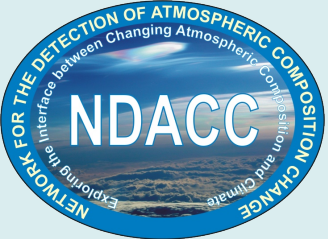
- *AGAGE, AERONET, MPLNET, NOAA-HATS, & SHADOZ*



NDACC Organization: Simple & Flexible

✧ **Steering Committee**

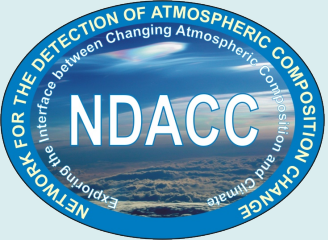
- *Internal operational and scientific oversight*
- *Implementation and funding recommendations*
- *Current Structure*
 - *2 Co-Chairs*
 - *Working Group Representatives*
 - *9 main NDACC instruments & sub-activities: Lidar, UV/Visible, Microwave, FTIR, Spectral UV, Dobson and Brewer, Aerosol and Ozonesondes, Theory, and Satellite*
 - *Other permanent or ad-hoc committees or working groups: Ozone, Water Vapor, etc.*
 - *Peer and Ex-Officio Representatives*
 - *countries, agencies, or organizations providing support for NDACC activities (site implementation, data use, etc.)*
 - *Representatives from Cooperating Networks*



NDACC Organization: Simple & Flexible

✧ **Science Team**

- *Forum for conducting Network operations*
- *Consists of PI's at all sites*
- *Coordinated through the Working Groups*
- *Responsible for setting actions to reach maximum internal consistency among Network data*
- *Typically meet annually*



NDACC History:

Station Considerations

✧ Initial Structure

○ Primary Stations

- Arctic, NH Mid-Latitudes, Tropics, SH Mid-Latitudes, Antarctic
- Fairly complete suite of instrument types at each station
- Long term measurement “commitment”
- Some stations were a combination of several sites

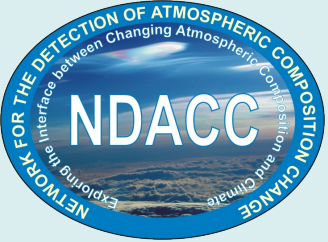
○ Complementary Stations/Sites

- Smaller number of instruments operating
- Possible shorter time measurement commitment

✧ Current Structure

○ NDACC-Approved Stations/Sites

- Some Complementary Stations had all instrument types and long term commitments
- Original designation misleading – no quality difference
- Original designation compromised long-term funding commitments



Recommendations for GRUAN

✧ **Don't Reinvent the Wheel**

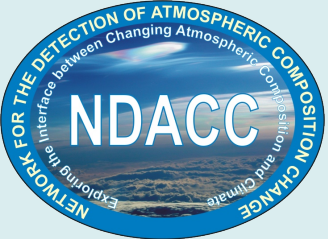
- *Draw On Capabilities of Established High-Quality Networks*
- *Augment These Capabilities as Needed to Provide Key Climate Variables on a Global Scale*

✧ **Instrument-Specific WGs First**

- *Include Engagement of Satellite Community*
 - *Validation enables patching of long-term datasets*
- *GRUAN is the Reference Network for GUAN*
 - *Emphasis on measurement accuracy & precision*
 - *Build-up phase is better supported by an instrument-specific organization*
 - *Mirror NDACC instrument WG functions*

✧ **Parameter-Specific WGs Second**

- *Once Instruments Are Fully Characterized*

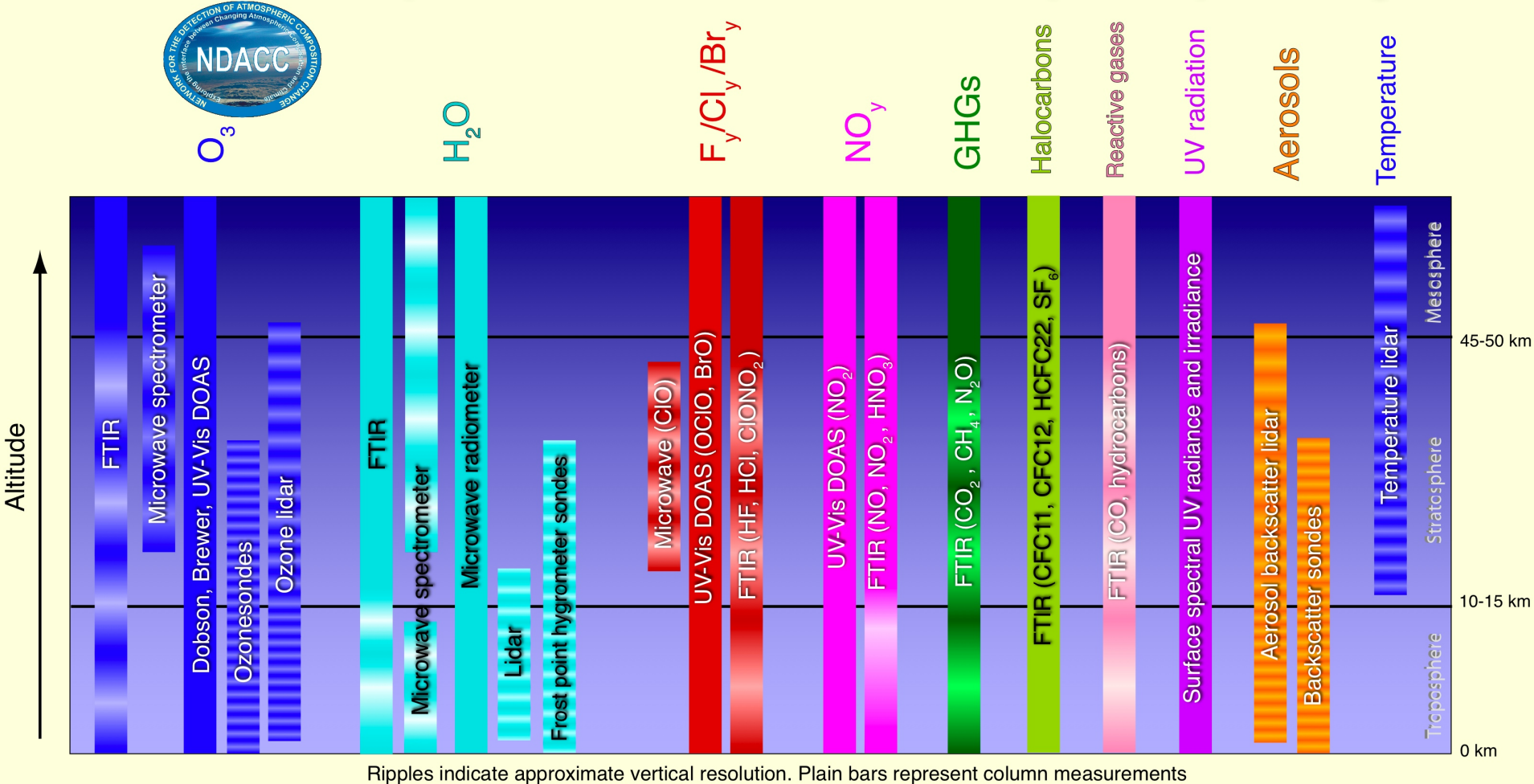


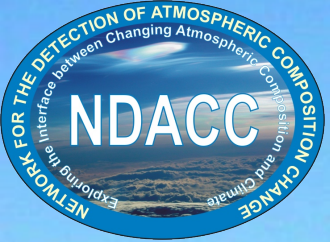
Recommendations for GRUAN

- ✧ ***Try to avoid compromising site selection due to institutional / political pressures***
 - *Encourage Collaborations at Another Site*
 - *Lauder site example in NDACC*
- ✧ ***Maintain Organizational Flexibility***
 - *Site Selection / Designation*
 - *Instrument & Measurement Requirements*
- ✧ ***NDACC Is Eager to Cooperate & Collaborate***
 - *Infrastructure & Instruments at NDACC Sites Can Aid in Campaign Implementation*
 - *Instrument intercomparison & characterization*
 - *Guide ongoing development of measurement requirements*
 - *Raman Lidar example for water vapor profiles*
 - *See Dave Whiteman's presentation later today*

NDACC Measurement Capabilities

Observational Capabilities of the Network for the Detection of Atmospheric Composition Change





Acknowledgements:

Geir Braathen (WMO)

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