



The National Center for Atmospheric Research (NCAR)

December 2006

Guy P. Brasseur
National Center for Atmospheric Research

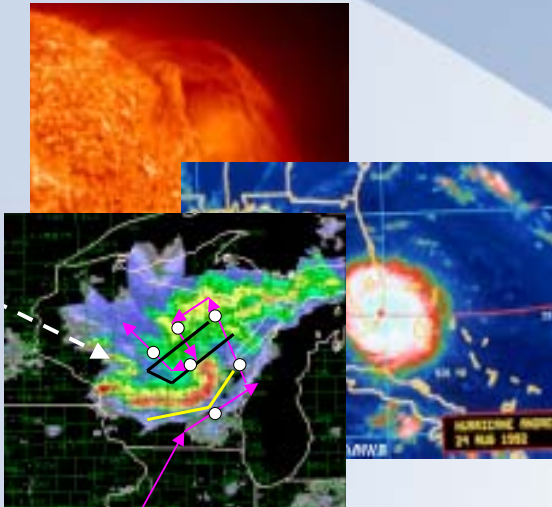


Walter Orr Roberts

“I have a very strong feeling that science exists to serve human welfare. It’s wonderful to have the opportunity given us by society to do basic research, but in return, we have a very important moral responsibility to apply that research to benefiting humanity.”



National Center for Atmospheric Research



- National Science Foundation funded Center, >1,000 Scientists and engineers, 47 year history
- Earth System Sciences: Computational and Observational Science and facilities for Weather, Climate, Chemistry, Space Weather, Society-Environment Interactions

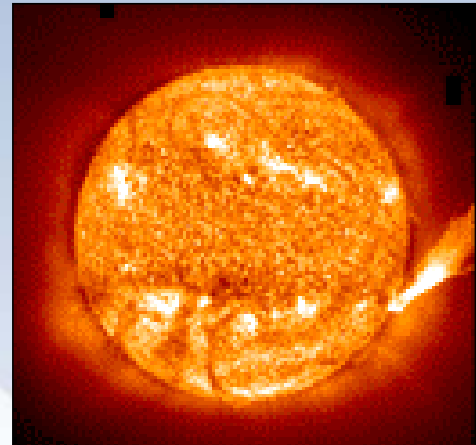
NCAR

National Center for Atmospheric Research

- A federally funded research and development center (FFRDC) operated by UCAR and supported by NSF (and others)
- A national center for research and education in the atmospheric and related sciences
- A provider of computational, data, and observational facilities and services for the university community

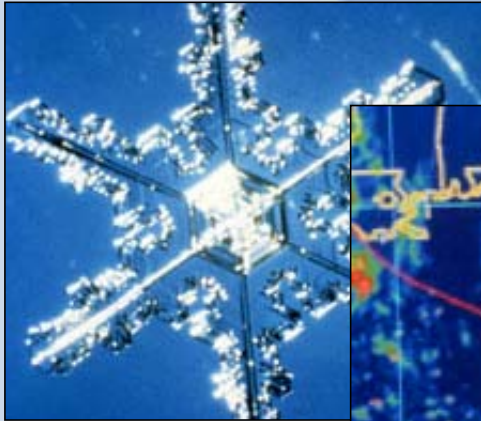


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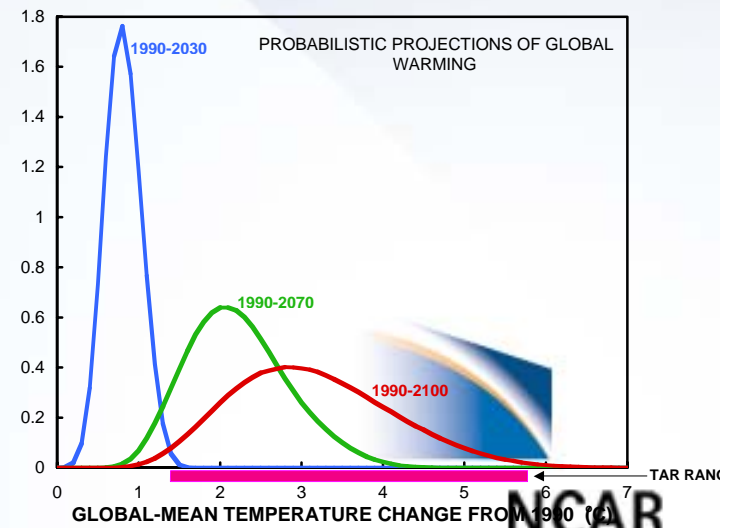


©NCAR

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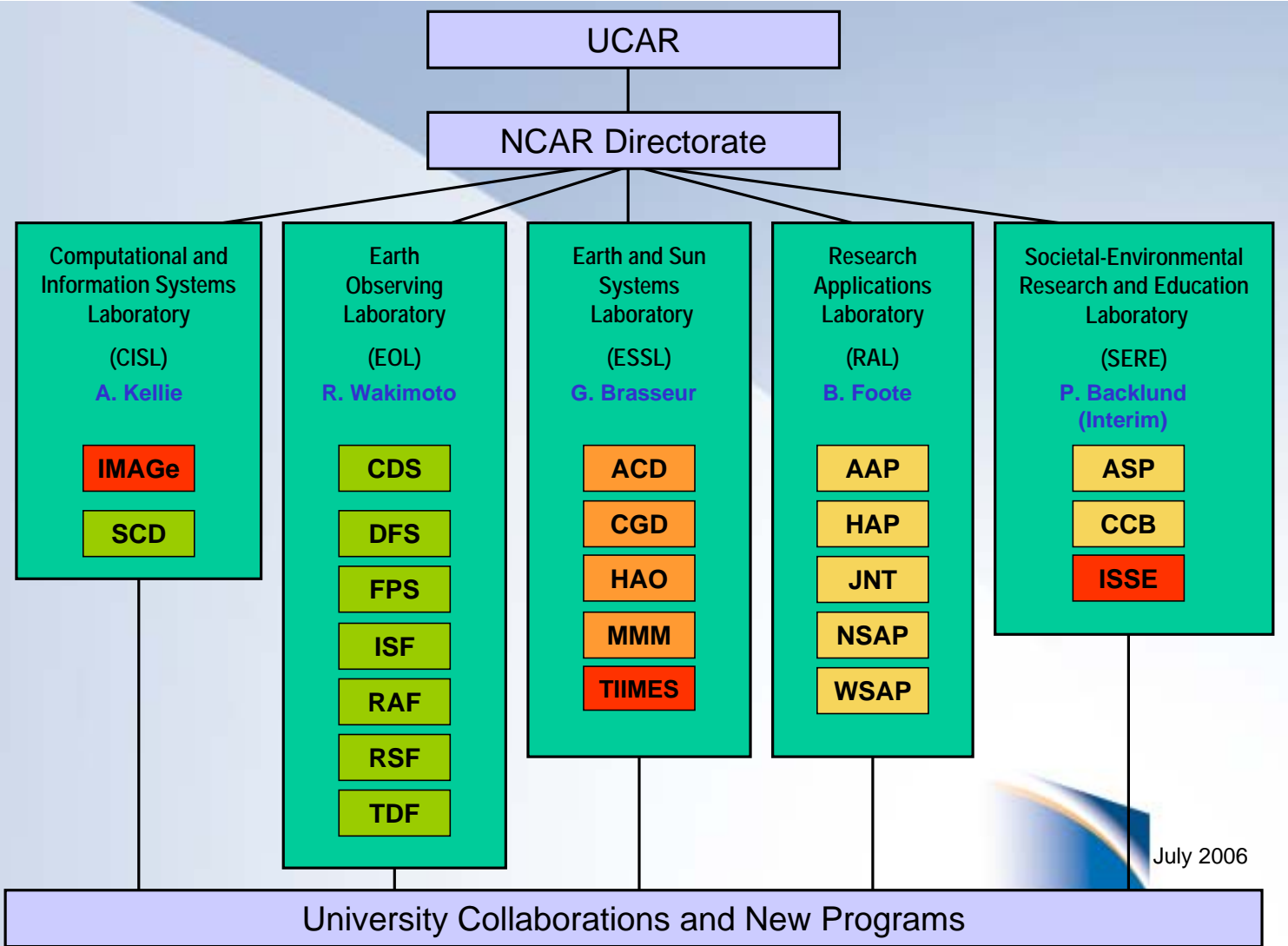


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Societal Impacts





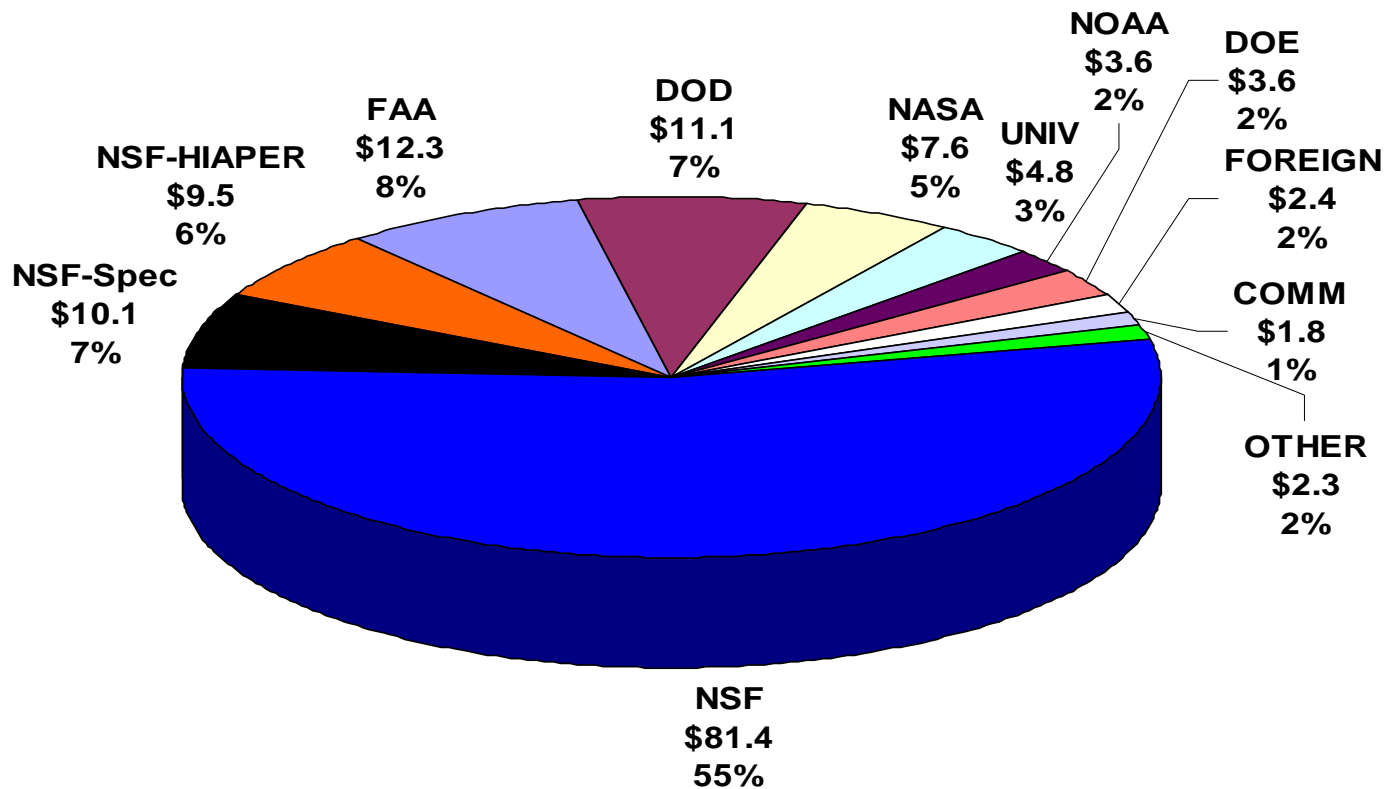
July 2006

Scientific Research Divisions Newly Formed Institutes Facility and Service Providers Education and Application Programs

FY2005 NCAR Expenditures by Fund Source

In Millions

Total: \$150.5



Themes of NCAR's Strategy

- ***Integrator*** – Generating and disseminating knowledge and information across disciplines and from many sources
- ***Innovator*** – Creating new practices and methods across our service, research, and education activities
- ***Community Builder*** – Organizing and supporting the community



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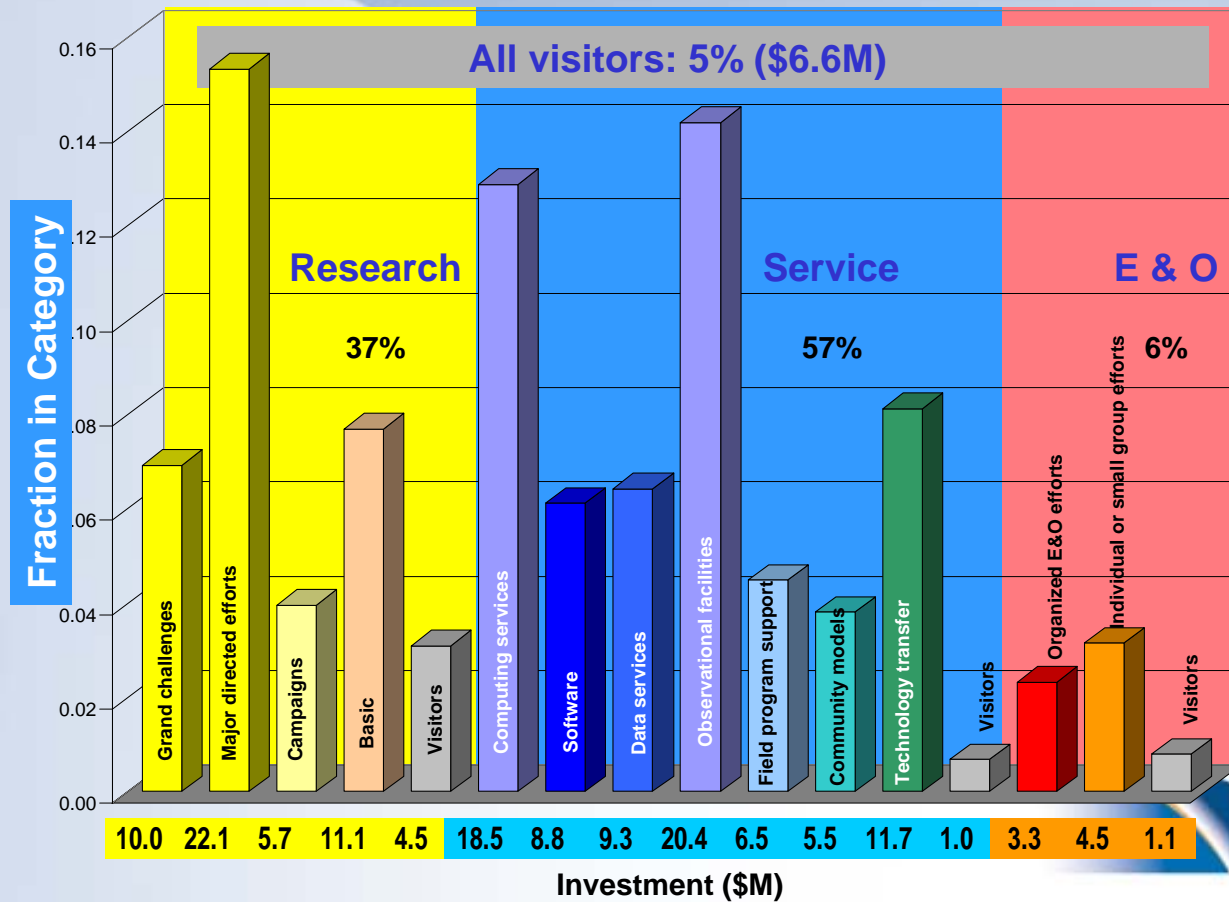
Threads - Our Crystal Ball

- Amazing Science (weather-seasonal-climate)
- Information Technology
- Decision Support
- Education
- Addressing grand challenges for science and society in the decades to come



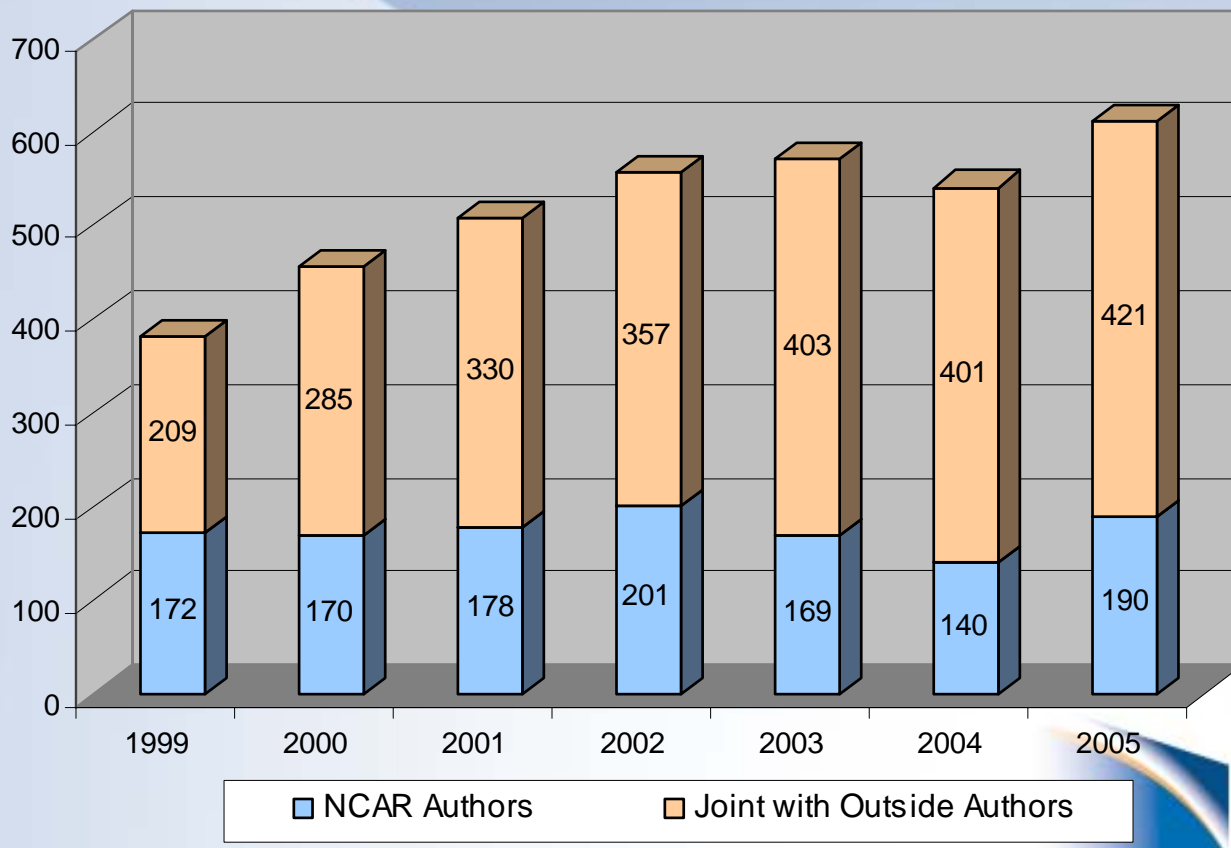
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NCAR – all Labs (\$143.9M)



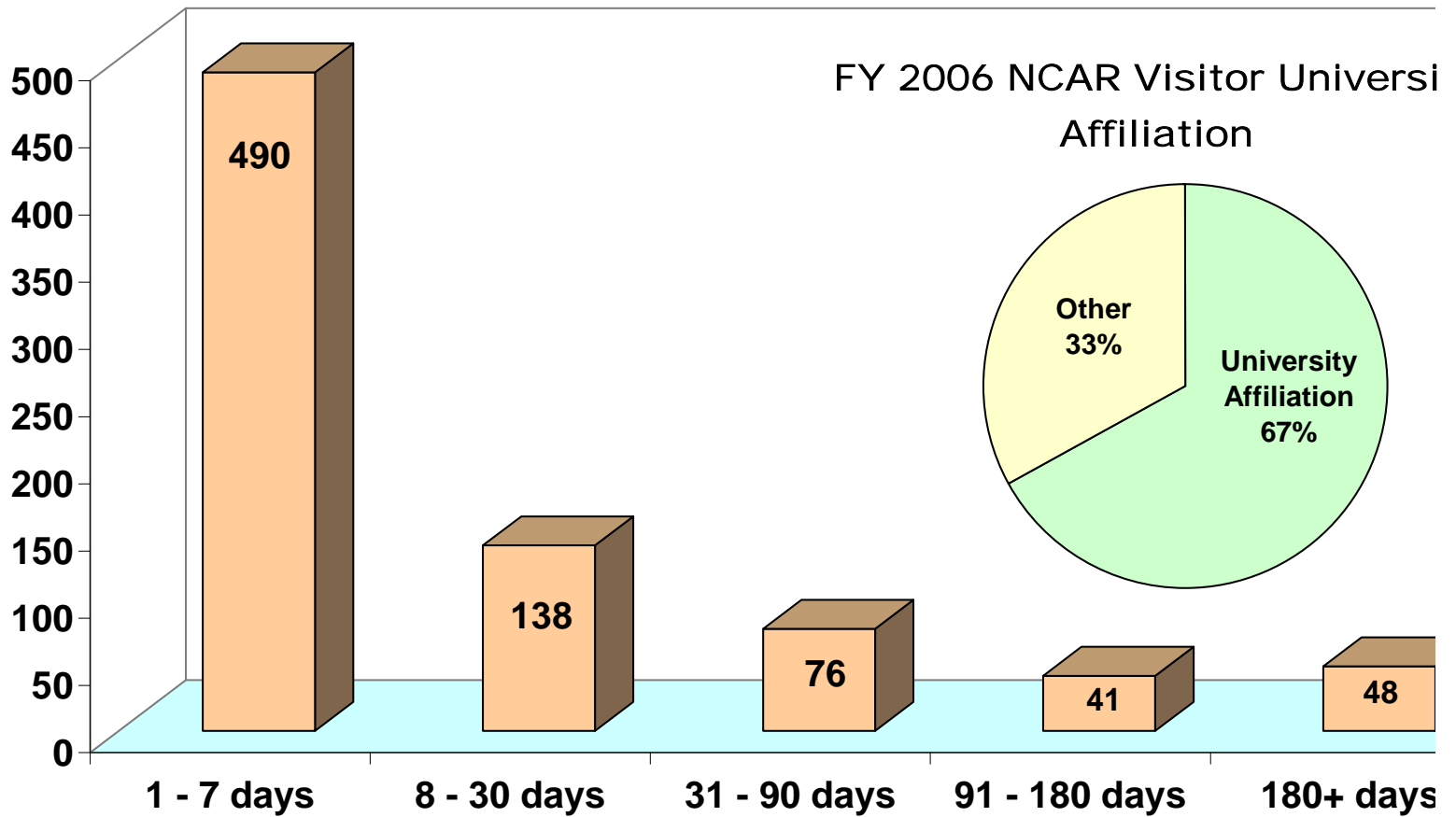
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NCAR Peer-Reviewed Publications



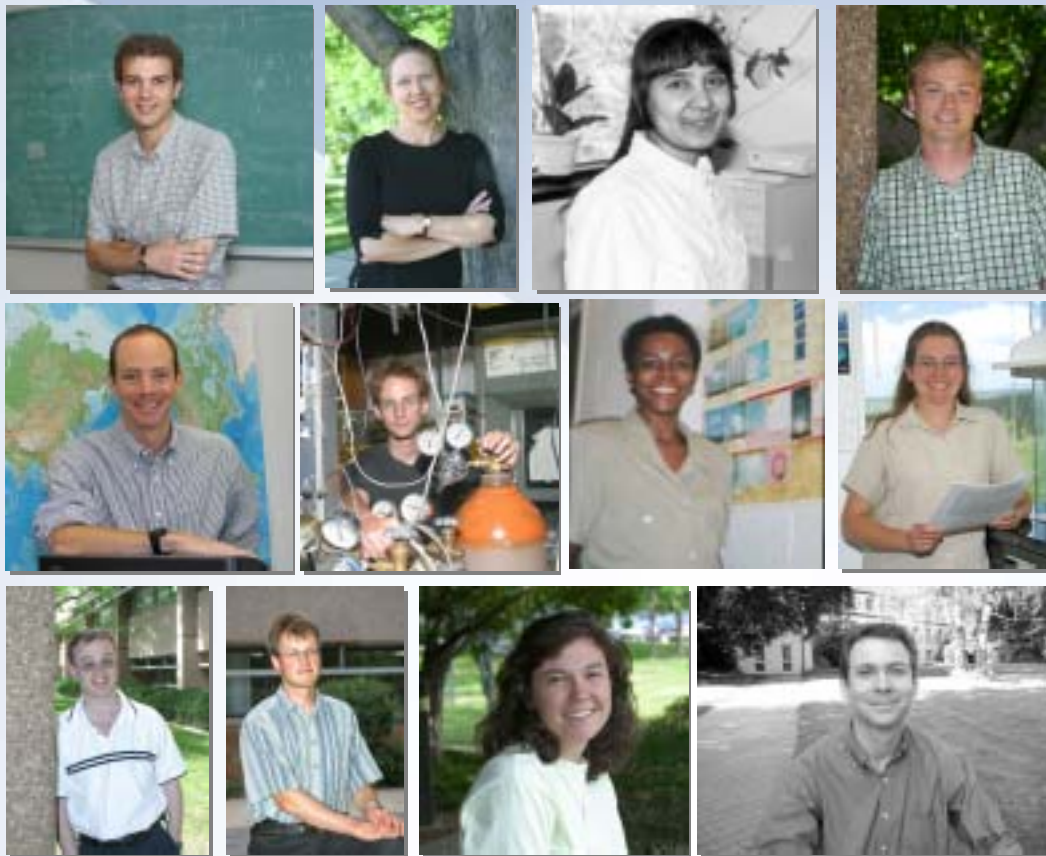
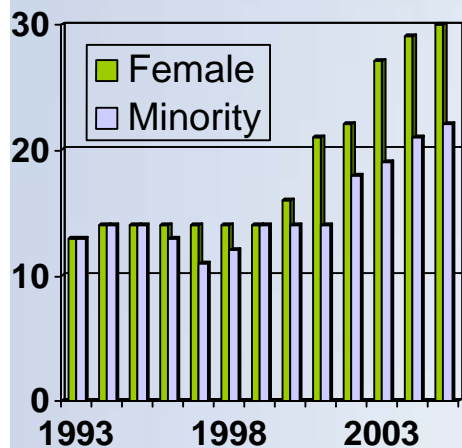
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Total NCAR Visits in FY 2006



A “Model Center” for the 21st Century

Some New NCAR Scientists



Science Highlights



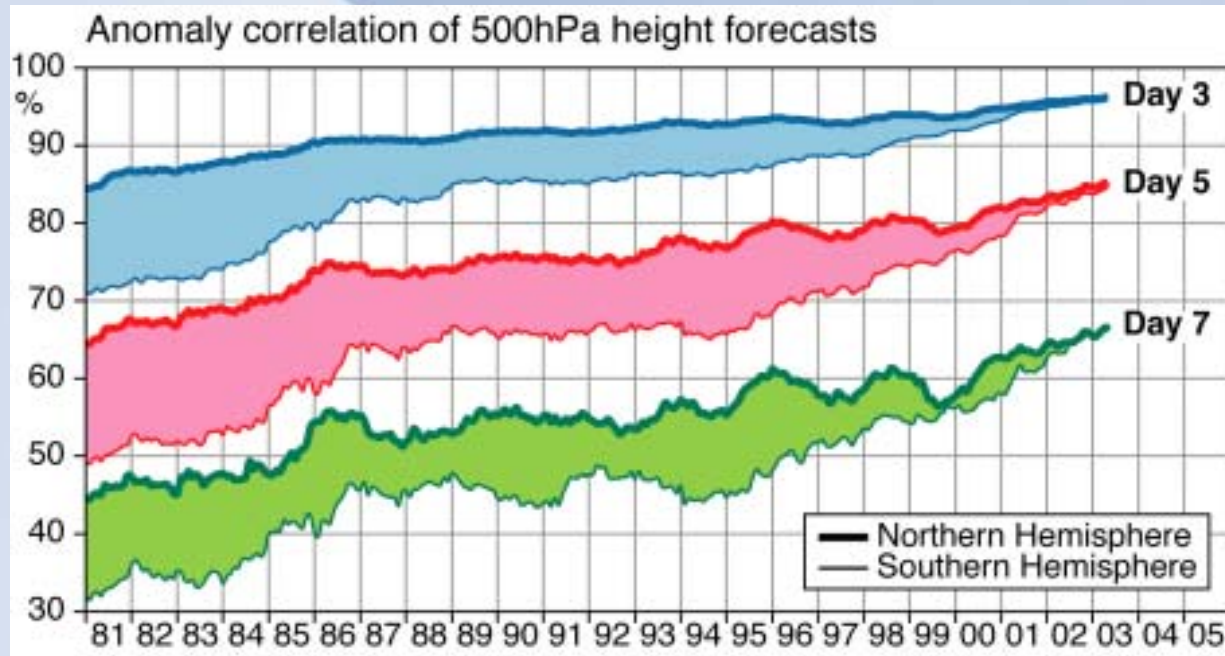
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Weather



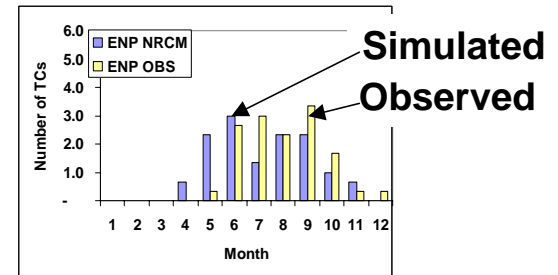
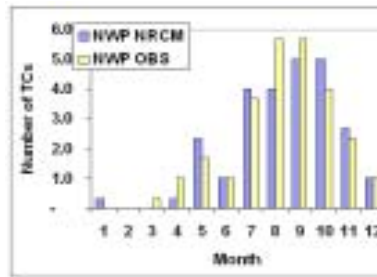
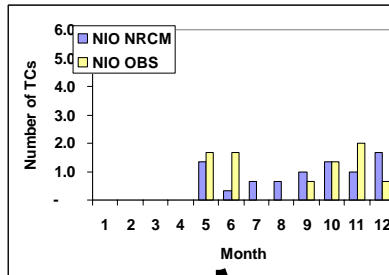
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Nature Reveals Her Secrets Slowly...

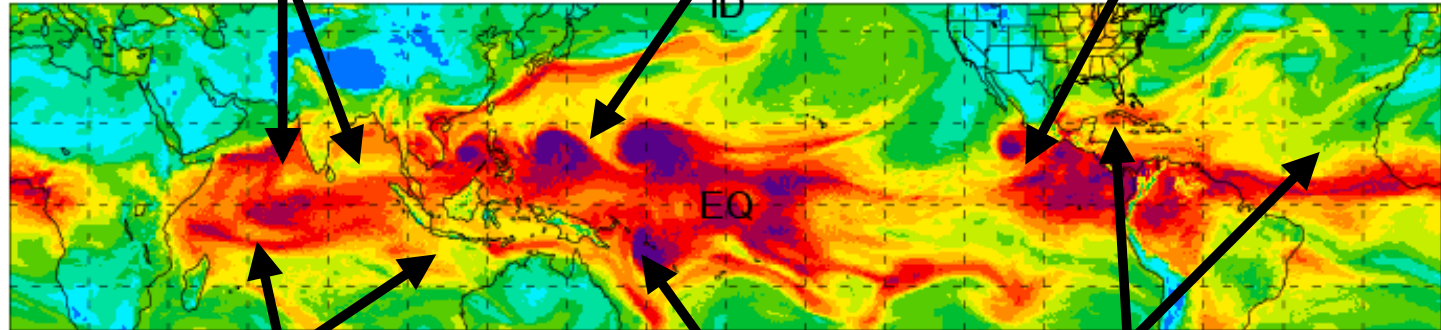


- ❑ “Day 5” weather forecast as accurate today as the “Day 3” forecast was 25 years ago!
- ❑ Both hemispheres now equally accurate (or inaccurate, depending on your point of view)

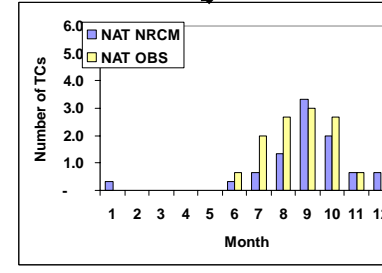
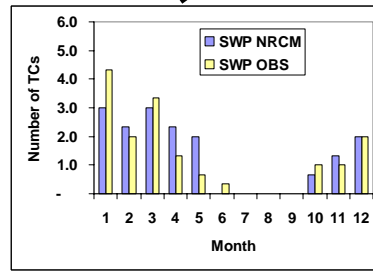
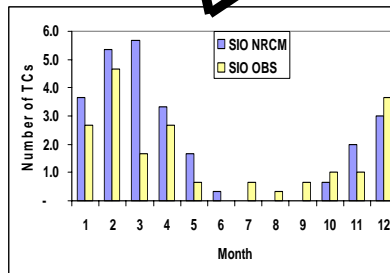
NCAR Regional Climate Modeling: 3-y Simulated Tropical Cyclone Development



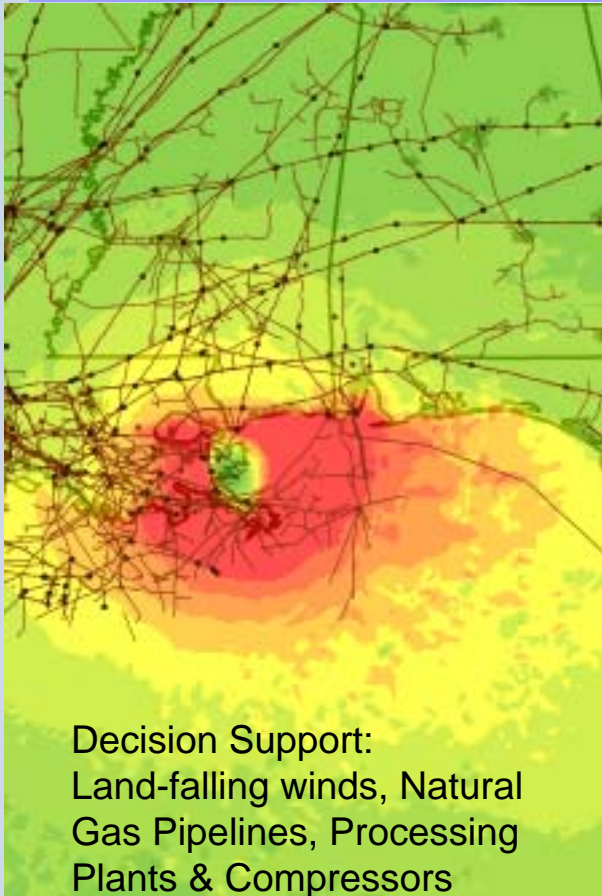
36km Domain



36km Simulation



Community Model: NCAR 4 km Moving-Grid Katrina Wind Forecast

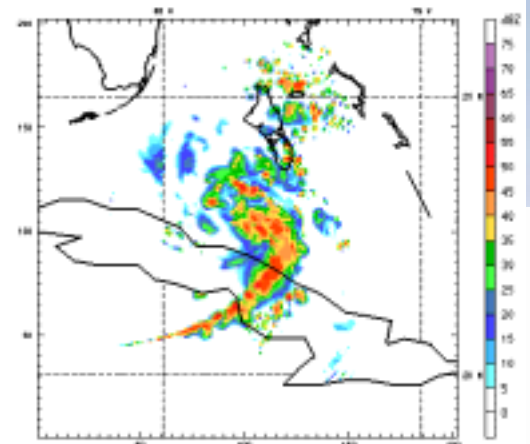


NCAR

ARW Forecast: Ernesto

TIME: 2008-08-26_20
2008-09-02_20

Map showing the forecast path of Hurricane Ernesto (2008) from the Gulf of Mexico to the Northeast United States. The map includes latitude (15°N to 40°N) and longitude (95°W to 70°W) markers. The storm's path is indicated by a series of dots and lines, with various intensity and speed labels (e.g., 1000, 1050, 1100, 1150, 1200, 1250, 1300, 1350, 1400, 1450, 1500, 1550, 1600, 1650, 1700, 1750, 1800, 1850, 1900, 1950, 2000, 2050, 2100, 2150, 2200, 2250, 2300, 2350, 2400, 2450, 2500, 2550, 2600, 2650, 2700, 2750, 2800, 2850, 2900, 2950, 3000, 3050, 3100, 3150, 3200, 3250, 3300, 3350, 3400, 3450, 3500, 3550, 3600, 3650, 3700, 3750, 3800, 3850, 3900, 3950, 4000, 4050, 4100, 4150, 4200, 4250, 4300, 4350, 4400, 4450, 4500, 4550, 4600, 4650, 4700, 4750, 4800, 4850, 4900, 4950, 5000, 5050, 5100, 5150, 5200, 5250, 5300, 5350, 5400, 5450, 5500, 5550, 5600, 5650, 5700, 5750, 5800, 5850, 5900, 5950, 6000, 6050, 6100, 6150, 6200, 6250, 6300, 6350, 6400, 6450, 6500, 6550, 6600, 6650, 6700, 6750, 6800, 6850, 6900, 6950, 7000, 7050, 7100, 7150, 7200, 7250, 7300, 7350, 7400, 7450, 7500, 7550, 7600, 7650, 7700, 7750, 7800, 7850, 7900, 7950, 8000, 8050, 8100, 8150, 8200, 8250, 8300, 8350, 8400, 8450, 8500, 8550, 8600, 8650, 8700, 8750, 8800, 8850, 8900, 8950, 9000, 9050, 9100, 9150, 9200, 9250, 9300, 9350, 9400, 9450, 9500, 9550, 9600, 9650, 9700, 9750, 9800, 9850, 9900, 9950, 10000, 10050, 10100, 10150, 10200, 10250, 10300, 10350, 10400, 10450, 10500, 10550, 10600, 10650, 10700, 10750, 10800, 10850, 10900, 10950, 11000, 11050, 11100, 11150, 11200, 11250, 11300, 11350, 11400, 11450, 11500, 11550, 11600, 11650, 11700, 11750, 11800, 11850, 11900, 11950, 12000, 12050, 12100, 12150, 12200, 12250, 12300, 12350, 12400, 12450, 12500, 12550, 12600, 12650, 12700, 12750, 12800, 12850, 12900, 12950, 13000, 13050, 13100, 13150, 13200, 13250, 13300, 13350, 13400, 13450, 13500, 13550, 13600, 13650, 13700, 13750, 13800, 13850, 13900, 13950, 14000, 14050, 14100, 14150, 14200, 14250, 14300, 14350, 14400, 14450, 14500, 14550, 14600, 14650, 14700, 14750, 14800, 14850, 14900, 14950, 15000, 15050, 15100, 15150, 15200, 15250, 15300, 15350, 15400, 15450, 15500, 15550, 15600, 15650, 15700, 15750, 15800, 15850, 15900, 15950, 16000, 16050, 16100, 16150, 16200, 16250, 16300, 16350, 16400, 16450, 16500, 16550, 16600, 16650, 16700, 16750, 16800, 16850, 16900, 16950, 17000, 17050, 17100, 17150, 17200, 17250, 17300, 17350, 17400, 17450, 17500, 17550, 17600, 17650, 17700, 17750, 17800, 17850, 17900, 17950, 18000, 18050, 18100, 18150, 18200, 18250, 18300, 18350, 18400, 18450, 18500, 18550, 18600, 18650, 18700, 18750, 18800, 18850, 18900, 18950, 19000, 19050, 19100, 19150, 19200, 19250, 19300, 19350, 19400, 19450, 19500, 19550, 19600, 19650, 19700, 19750, 19800, 19850, 19900, 19950, 20000, 20050, 20100, 20150, 20200, 20250, 20300, 20350, 20400, 20450, 20500, 20550, 20600, 20650, 20700, 20750, 20800, 20850, 20900, 20950, 21000, 21050, 21100, 21150, 21200, 21250, 21300, 21350, 21400, 21450, 21500, 21550, 21600, 21650, 21700, 21750, 21800, 21850, 21900, 21950, 22000, 22050, 22100, 22150, 22200, 22250, 22300, 22350, 22400, 22450, 22500, 22550, 22600, 22650, 22700, 22750, 22800, 22850, 22900, 22950, 23000, 23050, 23100, 23150, 23200, 23250, 23300, 23350, 23400, 23450, 23500, 23550, 23600, 23650, 23700, 23750, 23800, 23850, 23900, 23950, 24000, 24050, 24100, 24150, 24200, 24250, 24300, 24350, 24400, 24450, 24500, 24550, 24600, 24650, 24700, 24750, 24800, 24850, 24900, 24950, 25000, 25050, 25100, 25150, 25200, 25250, 25300, 25350, 25400, 25450, 25500, 25550, 25600, 25650, 25700, 25750, 25800, 25850, 25900, 25950, 26000, 26050, 26100, 26150, 26200, 26250, 26300, 26350, 26400, 26450, 26500, 26550, 26600, 26650, 26700, 26750, 26800, 26850, 26900, 26950, 27000, 27050, 27100, 27150, 27200, 27250, 27300, 27350, 27400, 27450, 27500, 27550, 27600, 27650, 27700, 27750, 27800, 27850, 27900, 27950, 28000, 28050, 28100, 28150, 28200, 28250, 28300, 28350, 28400, 28450, 28500, 28550, 28600, 28650, 28700, 28750, 28800, 28850, 28900, 28950, 29000, 29050, 29100, 29150, 29200, 29250, 29300, 29350, 29400, 29450, 29500, 29550, 29600, 29650, 29700, 29750, 29800, 29850, 29900, 29950, 30000, 30050, 30100, 30150, 30200, 30250, 30300, 30350



Model Info: 42 x 2 x 6 mm Cu, 900 PPM, 900 Springs, 2mm Core, 1.5mm, 34 Levels, 30 mm
 12: 9000 30: Double, 3000: 1mm/1.5mm, 20: 3mm

Robert Taylor - 421.2 8th St., Toluca, 208 Tulare, San-Carlos 1.2 Ha., 30 levels, 1 inch
11, 1970-80, 1981-82, 1983-84, 1985-86, 1987-88, 1989-90, 1991-92, 1993-94, 1995-96, 1997-98, 1999-00, 2001-02, 2003-04, 2005-06, 2007-08, 2009-10, 2011-12, 2013-14, 2015-16, 2017-18, 2019-20, 2021-22, 2023-24, 2025-26, 2027-28, 2029-30, 2031-32, 2033-34, 2035-36, 2037-38, 2039-40, 2041-42, 2043-44, 2045-46, 2047-48, 2049-50, 2051-52, 2053-54, 2055-56, 2057-58, 2059-60, 2061-62, 2063-64, 2065-66, 2067-68, 2069-70, 2071-72, 2073-74, 2075-76, 2077-78, 2079-80, 2081-82, 2083-84, 2085-86, 2087-88, 2089-90, 2091-92, 2093-94, 2095-96, 2097-98, 2099-00, 2101-02, 2103-04, 2105-06, 2107-08, 2109-10, 2111-12, 2113-14, 2115-16, 2117-18, 2119-20, 2121-22, 2123-24, 2125-26, 2127-28, 2129-30, 2131-32, 2133-34, 2135-36, 2137-38, 2139-40, 2141-42, 2143-44, 2145-46, 2147-48, 2149-50, 2151-52, 2153-54, 2155-56, 2157-58, 2159-60, 2161-62, 2163-64, 2165-66, 2167-68, 2169-70, 2171-72, 2173-74, 2175-76, 2177-78, 2179-80, 2181-82, 2183-84, 2185-86, 2187-88, 2189-90, 2191-92, 2193-94, 2195-96, 2197-98, 2199-00, 2201-02, 2203-04, 2205-06, 2207-08, 2209-10, 2211-12, 2213-14, 2215-16, 2217-18, 2219-20, 2221-22, 2223-24, 2225-26, 2227-28, 2229-30, 2231-32, 2233-34, 2235-36, 2237-38, 2239-40, 2241-42, 2243-44, 2245-46, 2247-48, 2249-50, 2251-52, 2253-54, 2255-56, 2257-58, 2259-60, 2261-62, 2263-64, 2265-66, 2267-68, 2269-70, 2271-72, 2273-74, 2275-76, 2277-78, 2279-80, 2281-82, 2283-84, 2285-86, 2287-88, 2289-90, 2291-92, 2293-94, 2295-96, 2297-98, 2299-00, 2301-02, 2303-04, 2305-06, 2307-08, 2309-10, 2311-12, 2313-14, 2315-16, 2317-18, 2319-20, 2321-22, 2323-24, 2325-26, 2327-28, 2329-30, 2331-32, 2333-34, 2335-36, 2337-38, 2339-40, 2341-42, 2343-44, 2345-46, 2347-48, 2349-50, 2351-52, 2353-54, 2355-56, 2357-58, 2359-60, 2361-62, 2363-64, 2365-66, 2367-68, 2369-70, 2371-72, 2373-74, 2375-76, 2377-78, 2379-80, 2381-82, 2383-84, 2385-86, 2387-88, 2389-90, 2391-92, 2393-94, 2395-96, 2397-98, 2399-00, 2401-02, 2403-04, 2405-06, 2407-08, 2409-10, 2411-12, 2413-14, 2415-16, 2417-18, 2419-20, 2421-22, 2423-24, 2425-26, 2427-28, 2429-30, 2431-32, 2433-34, 2435-36, 2437-38, 2439-40, 2441-42, 2443-44, 2445-46, 2447-48, 2449-50, 2451-52, 2453-54, 2455-56, 2457-58, 2459-60, 2461-62, 2463-64, 2465-66, 2467-68, 2469-70, 2471-72, 2473-74, 2475-76, 2477-78, 2479-80, 2481-82, 2483-84, 2485-86, 2487-88, 2489-90, 2491-92, 2493-94, 2495-96, 2497-98, 2499-00, 2501-02, 2503-04, 2505-06, 2507-08, 2509-10, 2511-12, 2513-14, 2515-16, 2517-18, 2519-20, 2521-22, 2523-24, 2525-26, 2527-28, 2529-30, 2531-32, 2533-34, 2535-36, 2537-38, 2539-40, 2541-42, 2543-44, 2545-46, 2547-48, 2549-50, 2551-52, 2553-54, 2555-56, 2557-58, 2559-60, 2561-62, 2563-64, 2565-66, 2567-68, 2569-70, 2571-72, 2573-74, 2575-76, 2577-78, 2579-80, 2581-82, 2583-84, 2585-86, 2587-88, 2589-90, 2591-92, 2593-94, 2595-96, 2597-98, 2599-00, 2601-02, 2603-04, 2605-06, 2607-08, 2609-10, 2611-12, 2613-14, 2615-16, 2617-18, 2619-20, 2621-22, 2623-24, 2625-26, 2627-28, 2629-30, 2631-32, 2633-34, 2635-36, 2637-38, 2639-40, 2641-42, 2643-44, 2645-46, 2647-48, 2649-50, 2651-52, 2653-54, 2655-56, 2657-58, 2659-60, 2661-62, 2663-64, 2665-66, 2667-68, 2669-70, 2671-72, 2673-74, 2675-76, 2677-78, 2679-80, 2681-82, 2683-84, 2685-86, 2687-88, 2689-90, 2691-92, 2693-94, 2695-96, 2697-98, 2699-00, 2701-02, 2703-04, 2705-06, 2707-08, 2709-10, 2711-12, 2713-14, 2715-16, 2717-18, 2719-20, 2721-22, 2723-24, 2725-26, 2727-28, 2729-30, 2731-32, 2733-34, 2735-36, 2737-38, 2739-40, 2741-42, 2743-44, 2745-46, 2747-48, 2749-50, 2751-52, 2753-54, 2755-56, 2757-58, 2759-60, 2761-62, 2763-64, 2765-66, 2767-68, 2769-70, 2771-72, 2773-74, 2775-76, 2777-78, 2779-80, 2781-82, 2783-84, 2785-86, 2787-88, 2789-90, 2791-92, 2793-94, 2795-96, 2797-98, 2799-00, 2801-02, 2803-04, 2805-06, 2807-08, 2809-10, 2811-12, 2813-14, 2815-16, 2817-18, 2819-20, 2821-22, 2823-24, 2825-26, 2827-28, 2829-30, 2831-32, 2833-34, 2835-36, 2837-38, 2839-40, 2841-42, 2843-44, 2845-46, 2847-48, 2849-50, 2851-52, 2853-54, 2855-56, 2857-58, 2859-60, 2861-62, 2863-64, 2865-66, 2867-68, 2869-70, 2871-72, 2873-74, 2875-76, 2877-

The illustration depicts a disaster management system. At the top, a satellite is shown in orbit, connected to a ground station on a hill. The ground station is linked to a network of other satellites and ground stations. A person is shown operating a computer, with a circular inset showing a map. A large cloud with lightning is also depicted.

The figure is a map of Europe and surrounding regions, overlaid with a color-coded scale representing turbulence intensity (CI). The scale ranges from 0 to 42,000, with colors transitioning from light green (0) to yellow (12,000), orange (24,000), and red (36,000 to 42,000). The map shows several areas of moderate and severe turbulence, with labels 'Moderate turbulence' and 'Severe turbulence' pointing to specific regions. White arrows indicate 'In situ turbulence reports' at various locations. The map also displays major flight paths and geographical features.

[illegible]

Legend

Waypoint

Moderate

Vertical cross-section



CNES/NCAR FLIGHT #1

DRIFTSONDE

Zinder, Niger

August 28, 2006

Launch 8:23 UTC

24 sondes

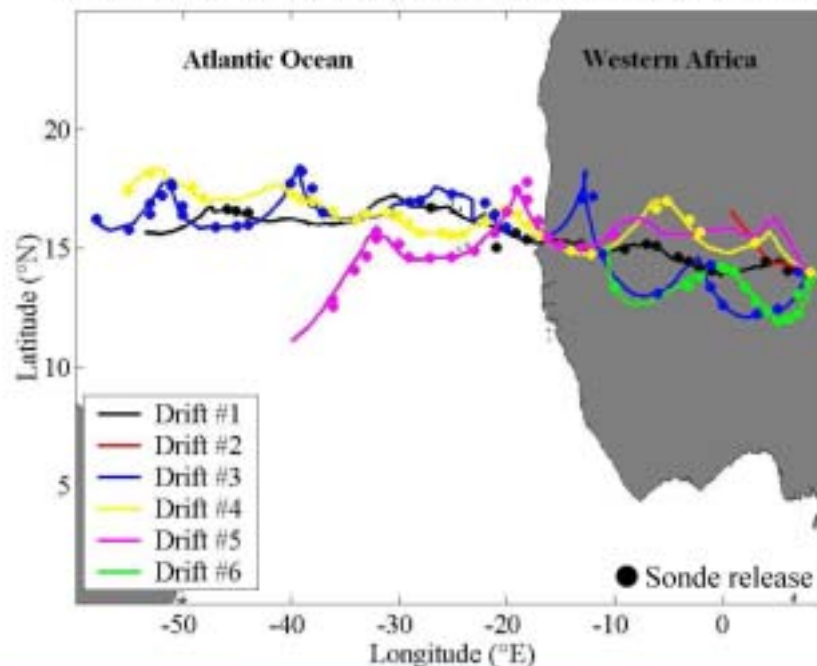


NCAR

Driftsonde missions

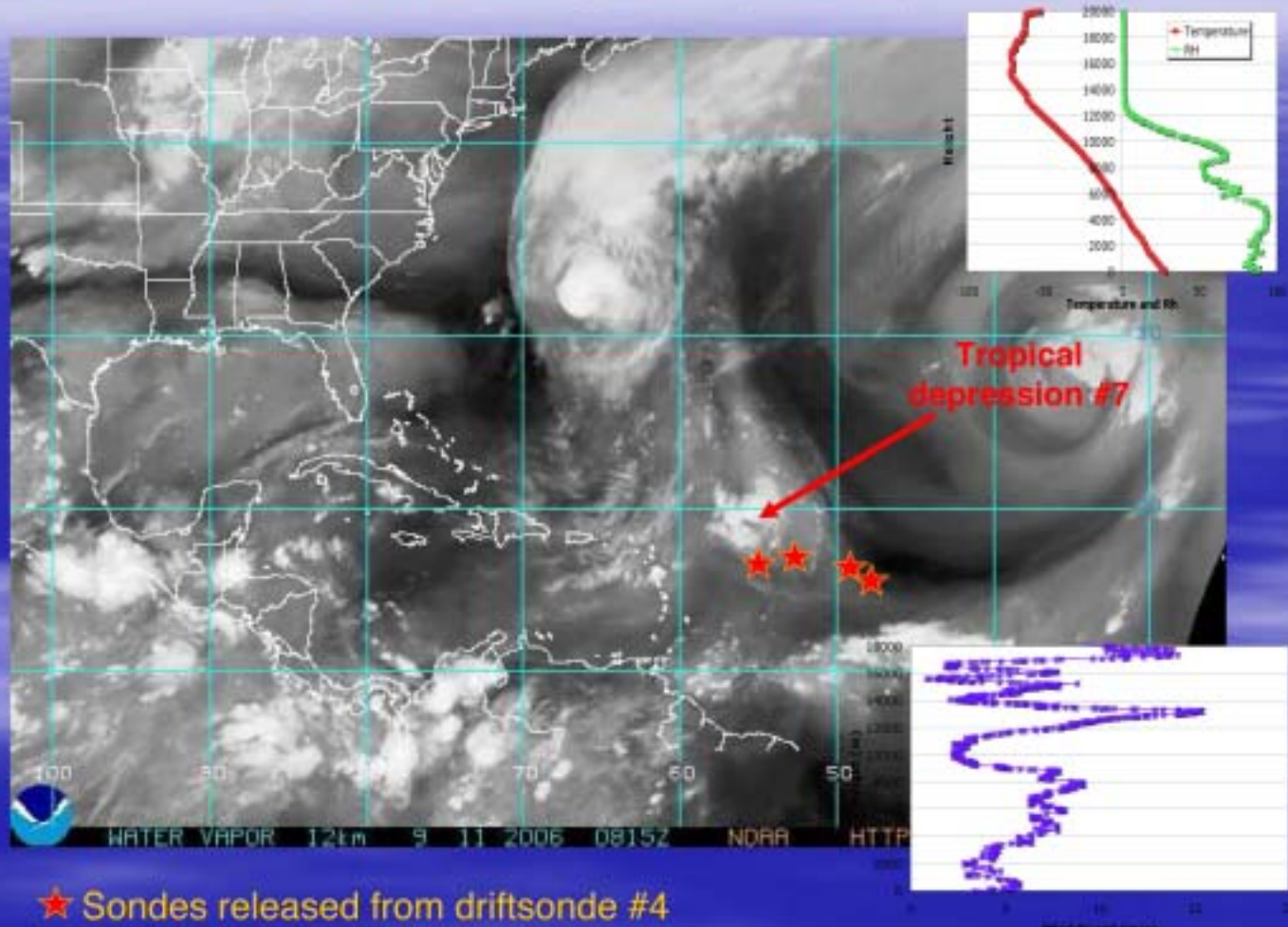
- Driftsonde #1: launch on August 28th 0823 UTC; terminated on September 3rd 1600 UTC
- Driftsonde #2: launch on August 29th 1915 UTC; terminated August 30th 1530 UTC
- Driftsonde #3: launch on September 1st 1815 UTC; terminated on September 9th 1600 UTC
- Driftsonde #4: launch on September 4th 1750 UTC; terminated on September 11th 1700 UTC
- Driftsonde #5: launch on September 6th 1750 UTC; still in the air
- Driftsonde #6: launch on September 9th 1810 UTC; still in the air

Driftsonde trajectories and dropsonde locations on September 12th 2006



Driftsonde data

Driftsonde 4 in the vicinity of tropical depression #7



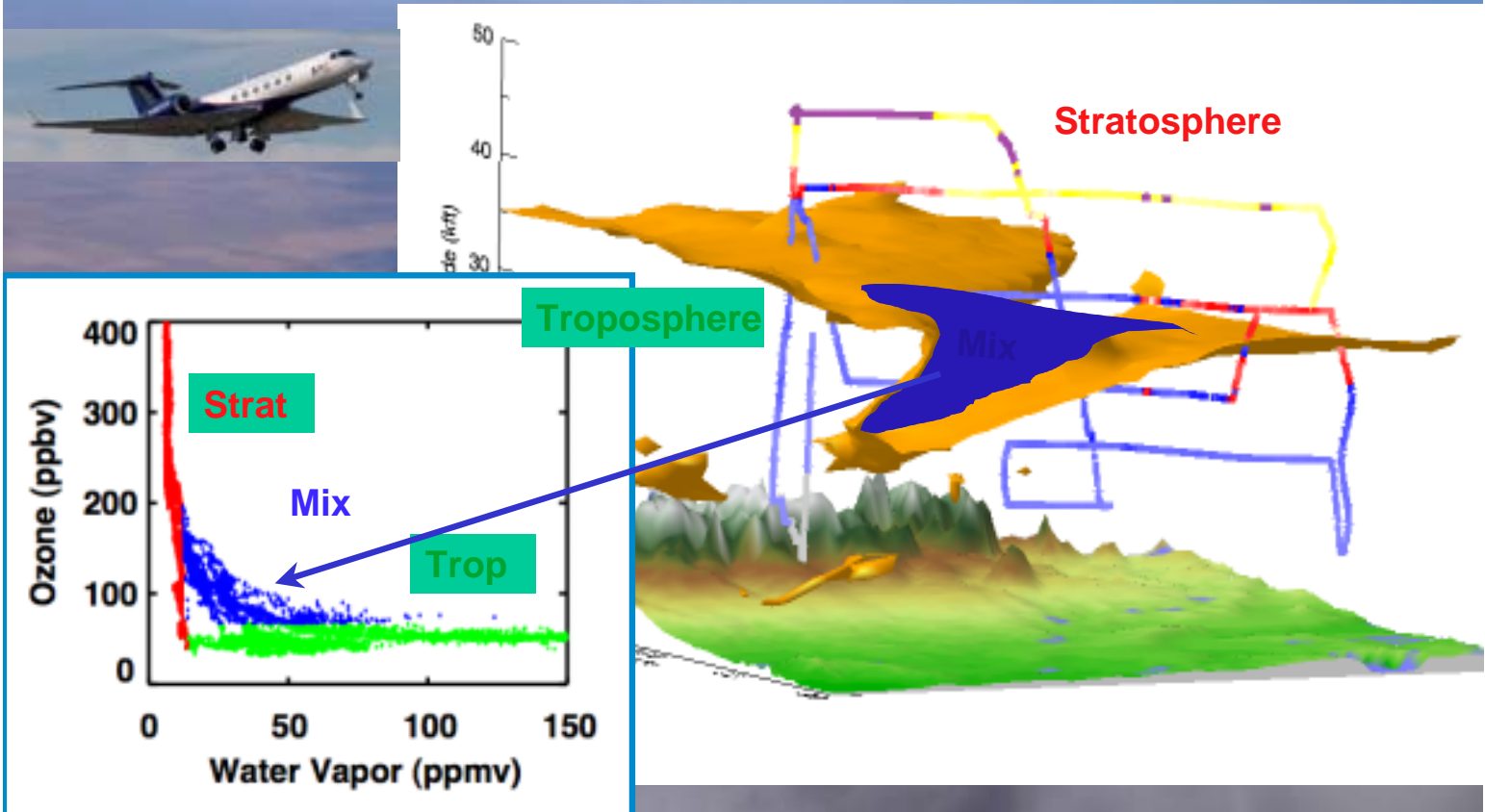
Atmospheric Chemistry



NCAR

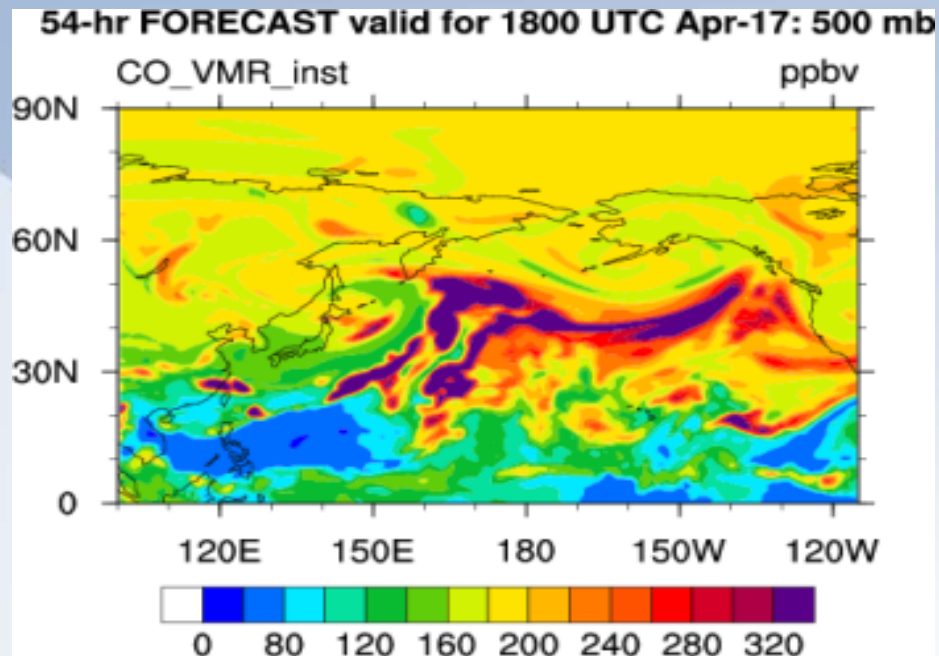
Chemical Behavior of the Tropopause Observed on the 1st HIAPER Research Flight

Tropopause fold and the mixing of stratosphere and troposphere air
2005-12-01, the START experiment





Forecasting Pollution Plumes



- Atmospheric chemistry field campaign flight planning is aided by the ability to forecast the occurrence of pollution plumes
- The ACD satellite and modeling groups have developed a unique tool that was used during the Spring 2006 NSF/NCAR MIRAGE and NASA INTEx-B campaigns
- A pollution plume predictive capability was provided by the assimilation of near-real-time MOPITT carbon monoxide data into the MOZART chemical transport model
- This clearly indicated the intercontinental transport pathways of pollution from Chinese industry and south Asian biomass burning, guiding aircraft flight tracks

Pollution in the Mexico City Valley

(Photo taken from the NASA/UND DC-8 Aircraft)



Megacity Impacts on Regional and Global Environments

MIRAGE - IOP 1-30 March 2006

Scientific objectives:

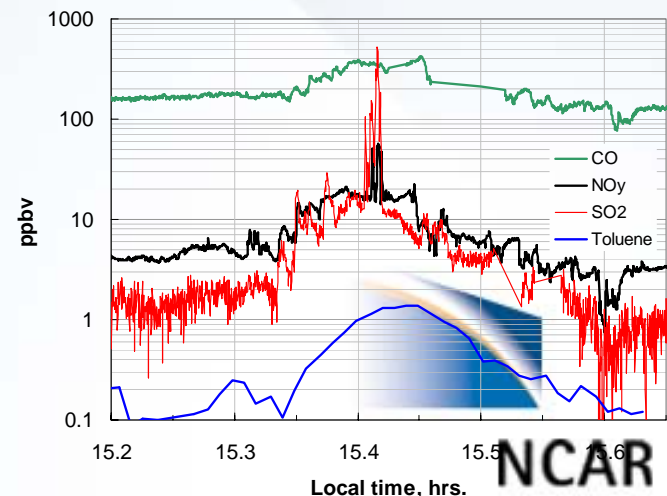
- First ever characterization of regional air quality in Mexico
- Geographical extent and temporal persistence of the urban plume
- Regional production of oxidants and radicals
- Fate of hydrocarbon oxidation products
- Long-range transport of reactive nitrogen
- Coupled gas-aerosol processes
- Evolution of aerosol radiative and microphysical properties
- Regional surface-atmosphere interactions

Partners:

- Agencies: NSF, DOE, NASA, Mexican govt.
- Universities: 43 (29 US)
- About 300 non-Mexican and 100 Mexican participants

Tools:

- NCAR C-130 and 5 other aircraft
- 3 ground-based supersites in and near Mexico City
- Mobile surface laboratories
- Satellite observations and numerical simulations



Climate



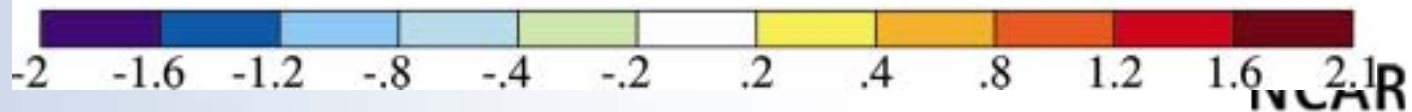
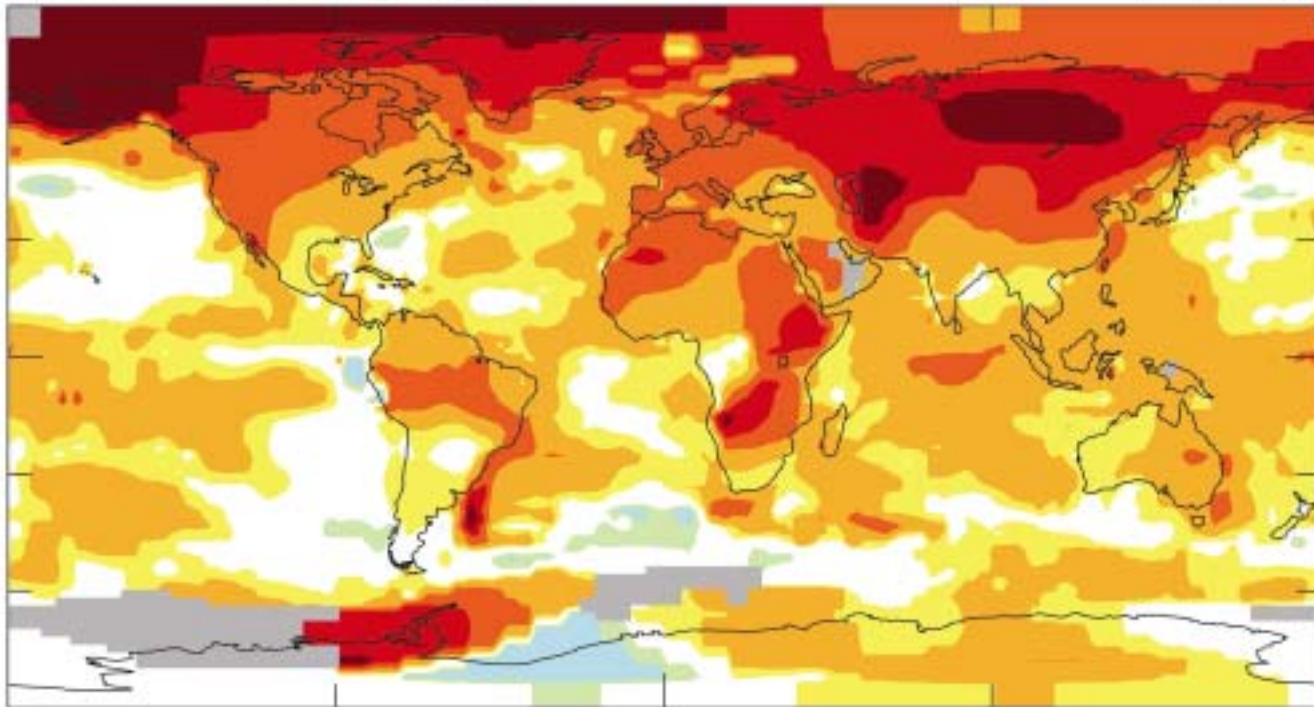
NCAR

A Warming World...

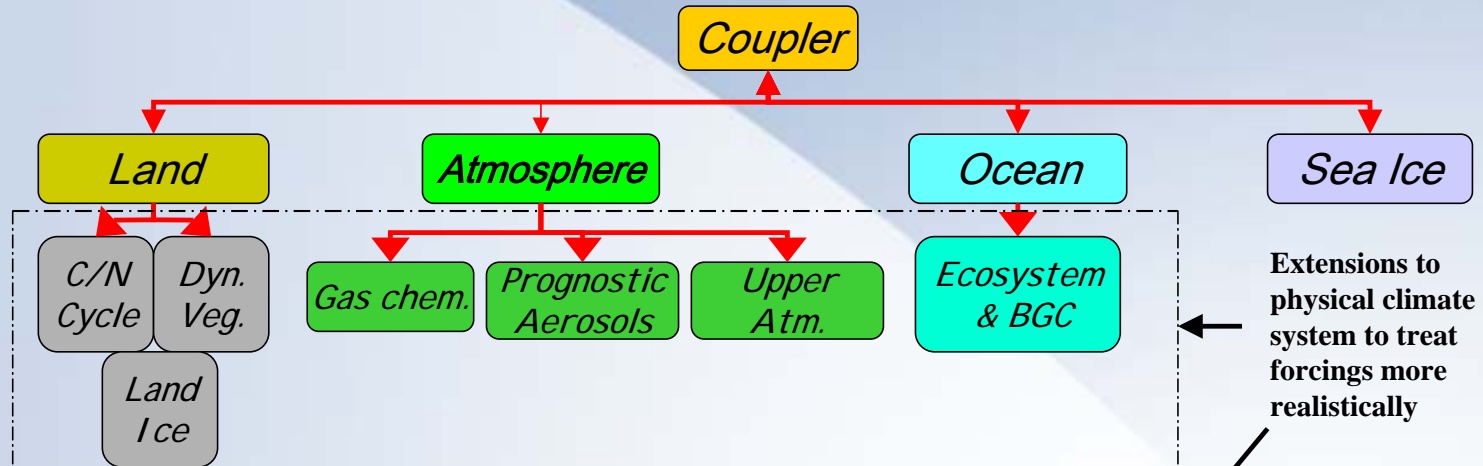
2001-2005 Mean Surface Temperature Anomaly ($^{\circ}\text{C}$)

Base Period = 1951-1980

Global Mean = 0.53



Climate Forcing



Extensions to physical climate system to treat forcings more realistically

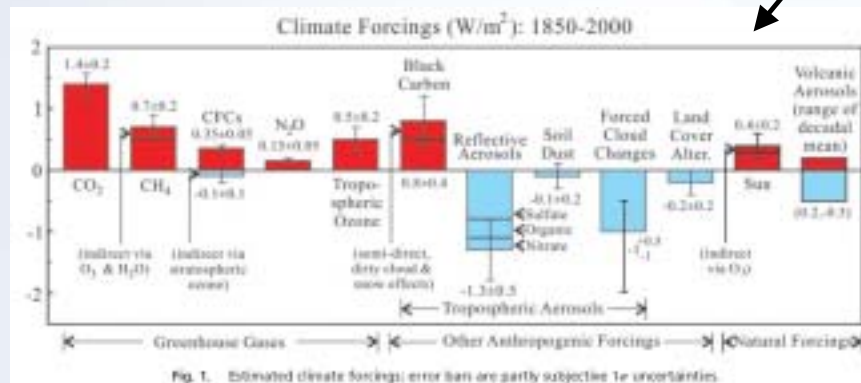
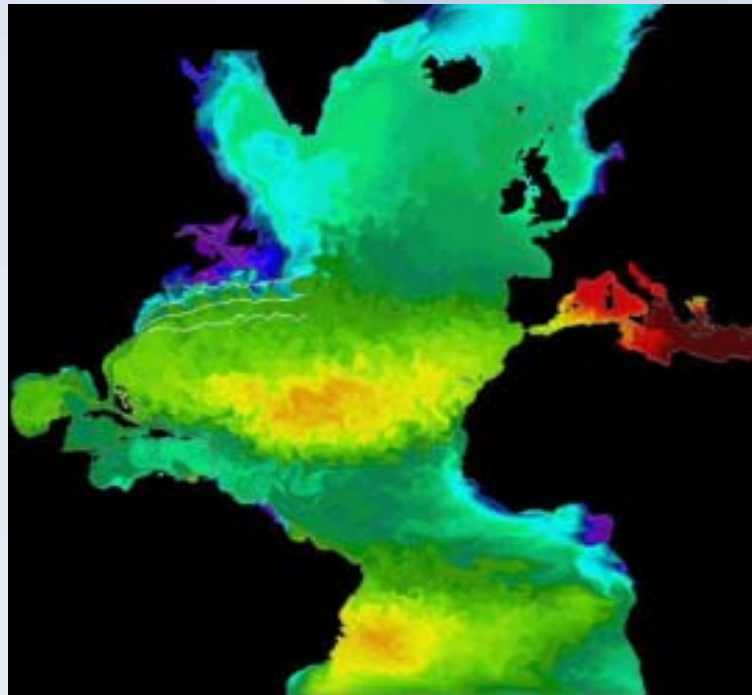


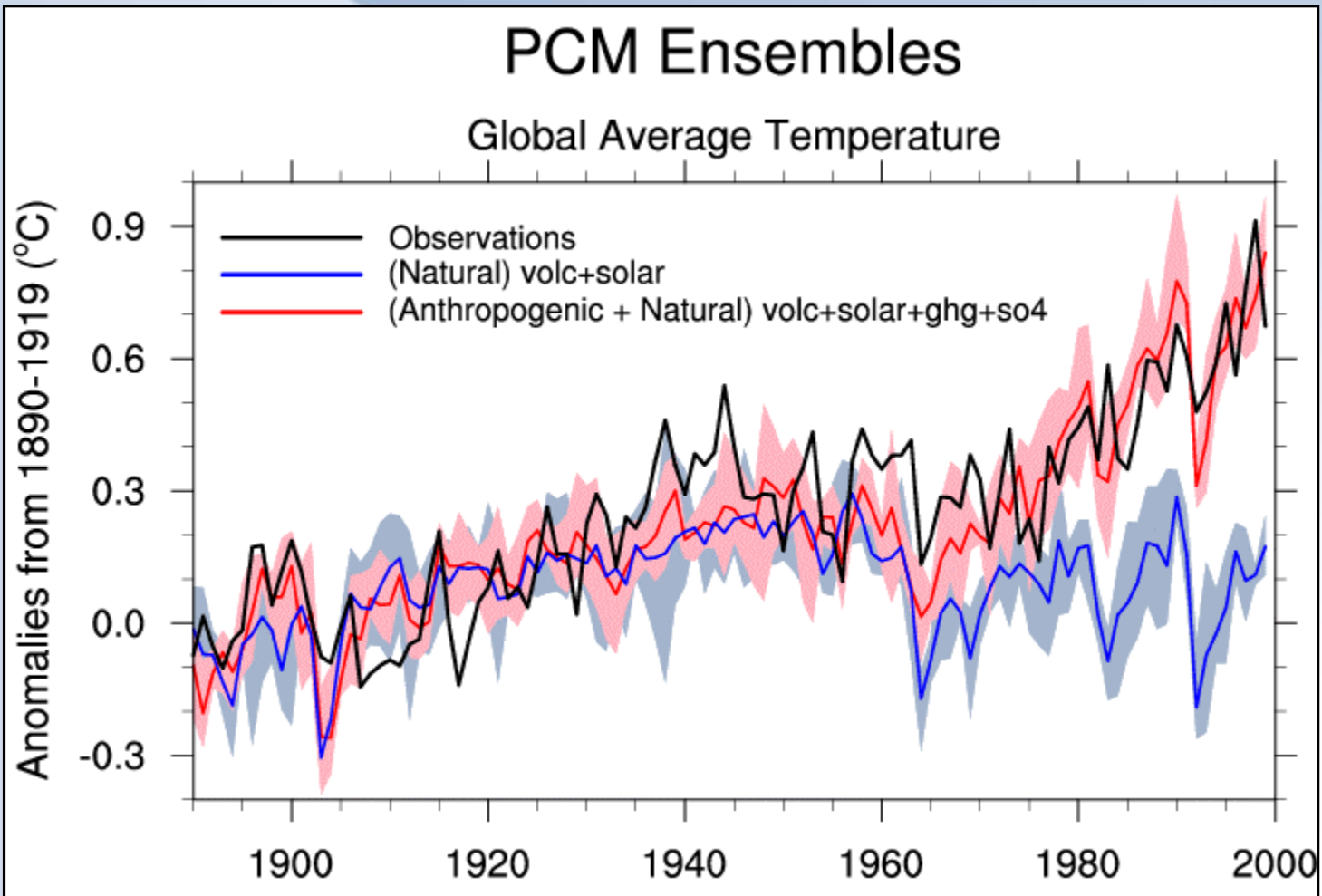
Fig. 1. Estimated climate forcings; error bars are partly subjective to uncertainties.

Need for High Resolution

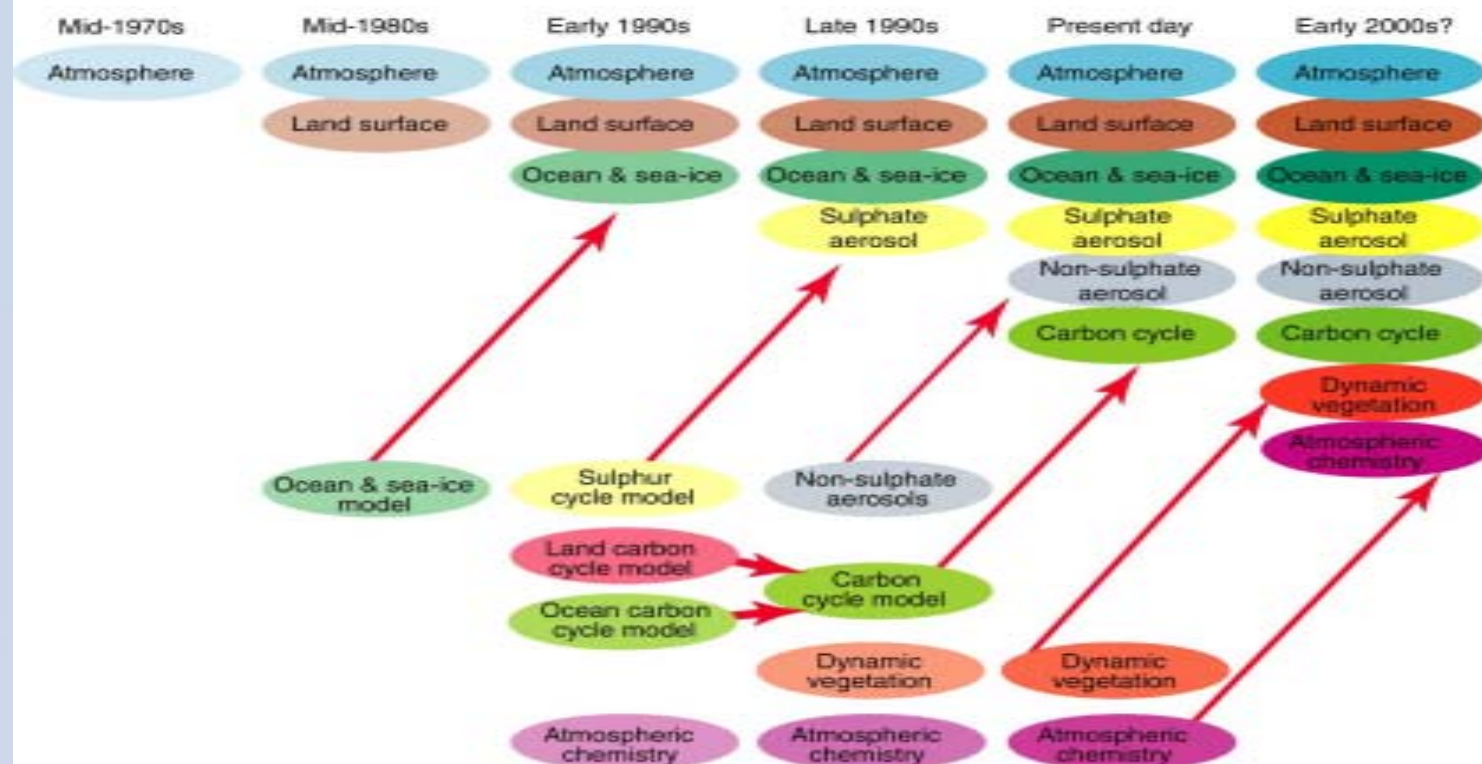


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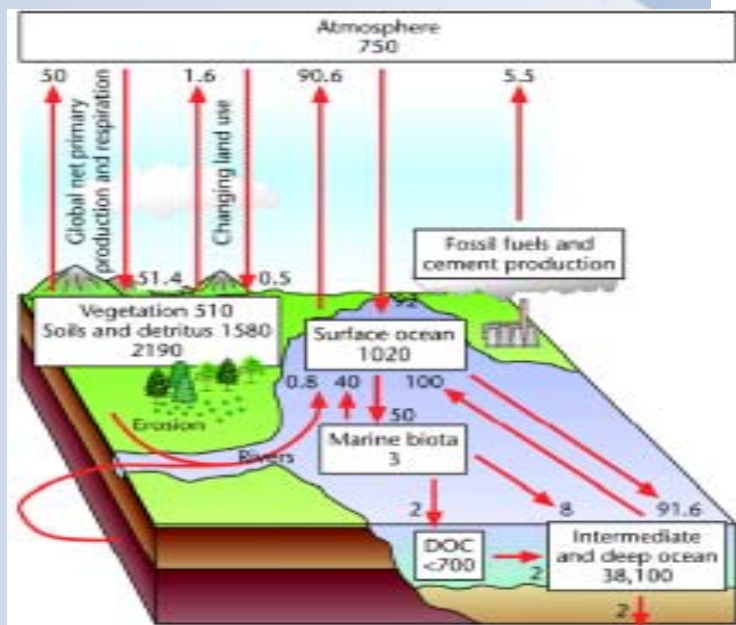
NCAR Models can reproduce past climates



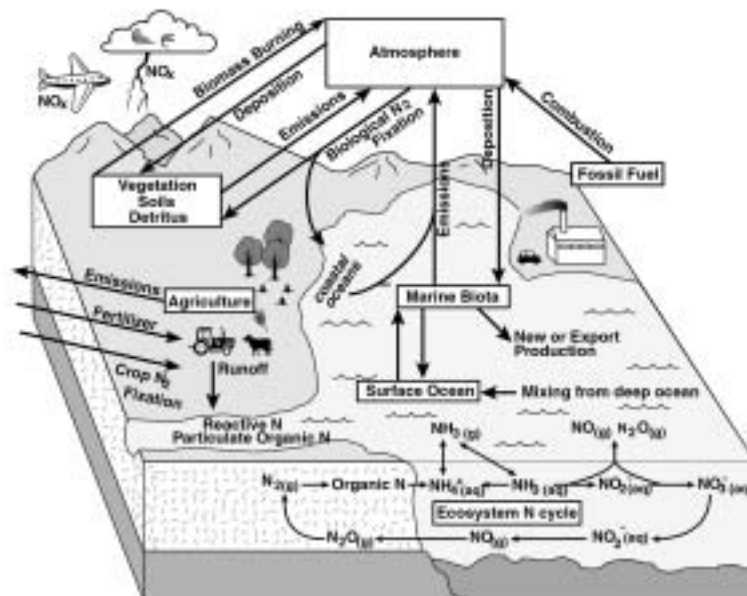
The Development of Climate models, Past, Present and Future



Putting the pieces together:



The GLOBAL C CYCLE



The GLOBAL N CYCLE

Surprises in store?

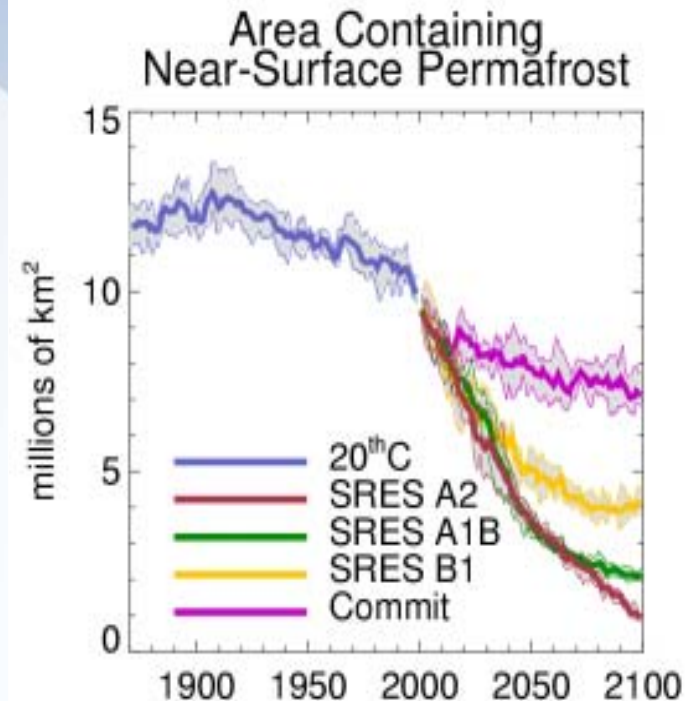
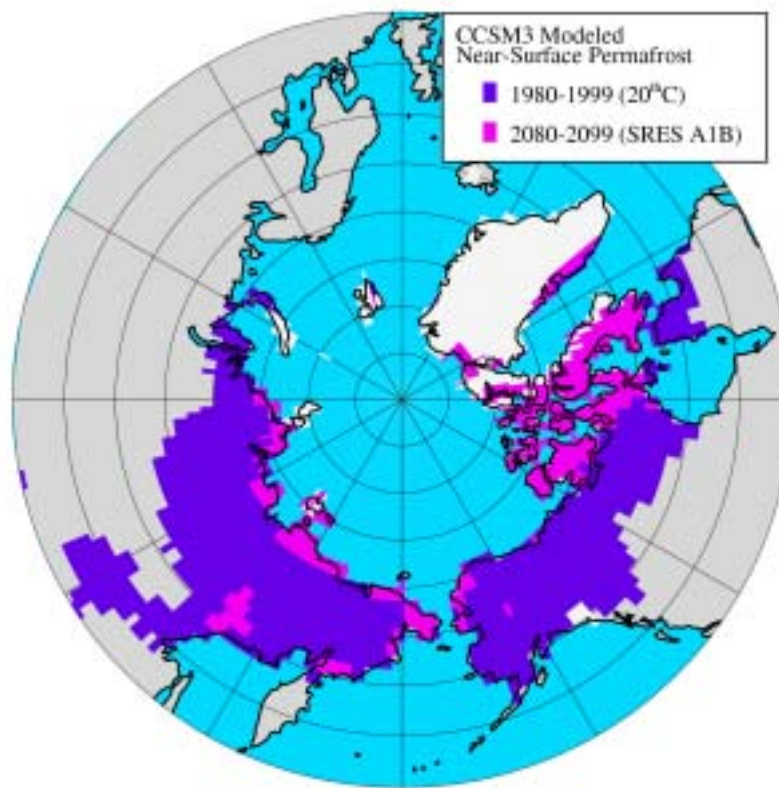
Surface Melt on Greenland

Melt descending into a moulin, a vertical shaft carrying water to ice sheet base.

Source: Roger Braithwaite, University of Manchester (UK)



CCSM3 Projections of Degradation of Near-Surface Permafrost

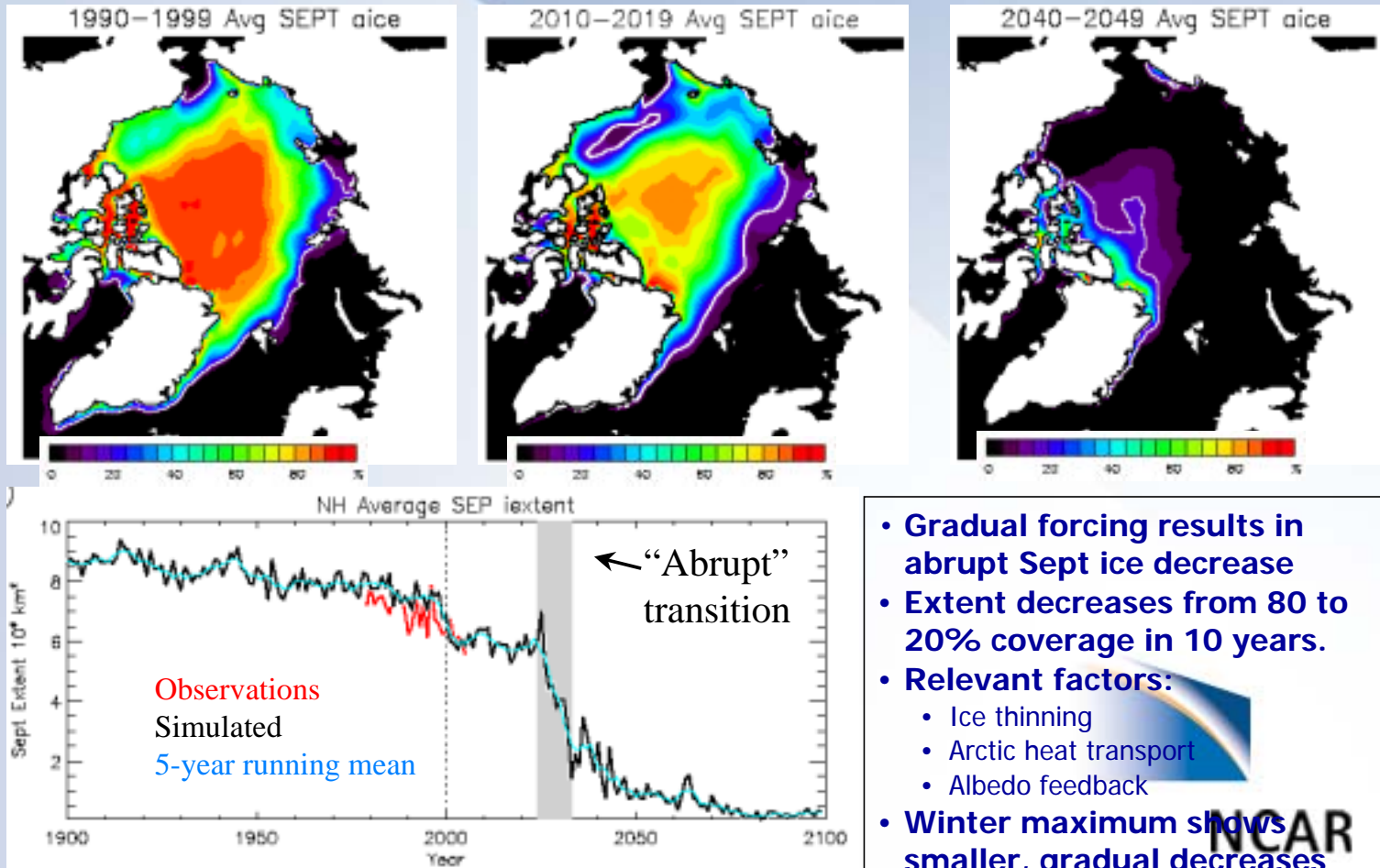


Lawrence and Slater, 2005

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Simulation of Future Climate

Abrupt Transitions in the Summer Sea Ice

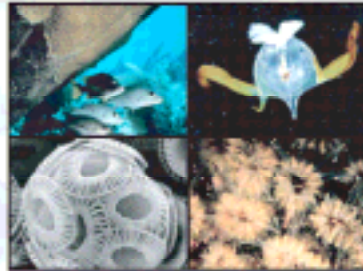


- Gradual forcing results in abrupt Sept ice decrease
- Extent decreases from 80 to 20% coverage in 10 years.
- Relevant factors:
 - Ice thinning
 - Arctic heat transport
 - Albedo feedback
- Winter maximum shows smaller, gradual decreases

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IMPACTS OF OCEAN ACIDIFICATION ON CORAL REEFS AND OTHER MARINE CALCIFIERS

A GUIDE TO FUTURE RESEARCH



REPORT OF A WORKSHOP SPONSORED BY
NSF NOAA USGS

JA KLEYPAS . RA FEELY . VJ FABRY
C LANGDON . CL SABINE . LL ROBBINS

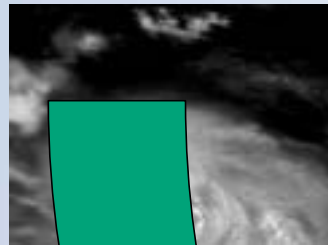


Implications of Ocean Acidification for Marine Life

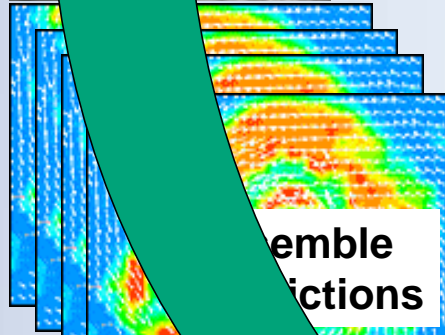
1. Ocean chemistry is changing to a state that has not occurred for millions of years
2. Shell-building in marine organisms will slow down
3. Reef-building will decrease, stop, or reverse
4. Fundamental changes will occur in marine ecosystems



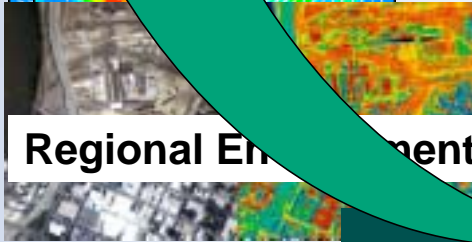
Integrating research model and data into end-use knowledge systems



**Weather/Climate Data
Assimilation Models**



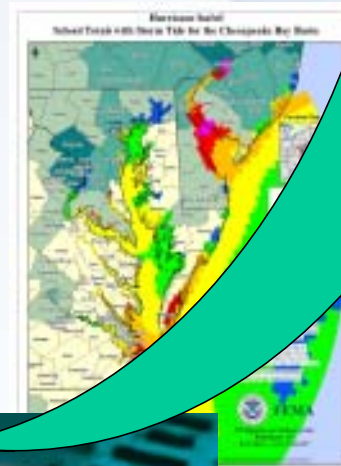
**Ensemble
Predictions**



**Regional Environmental
Impacts**



Reliable Power Delivery



**Operational
Implementation**



Decision Tools

NCAR

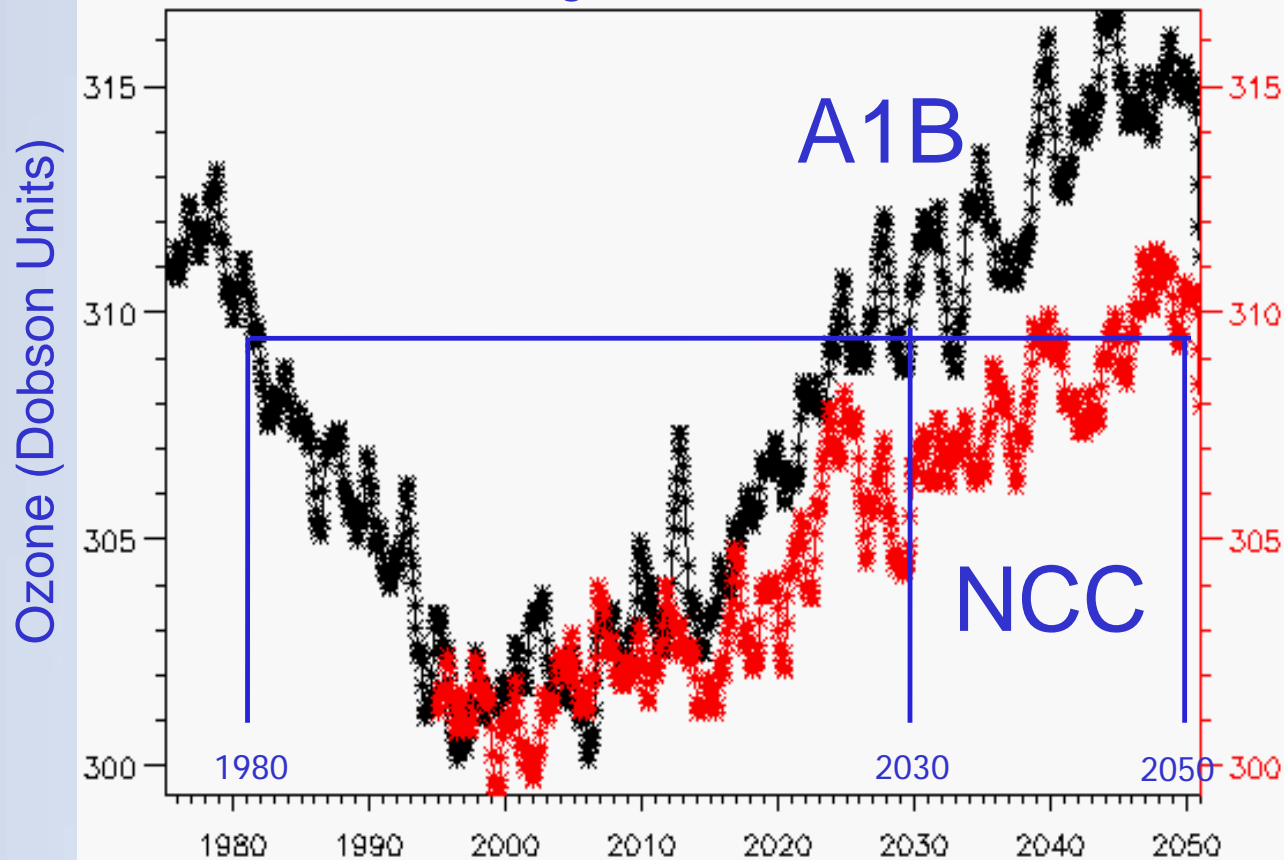
Solar-Terrestrial Relations



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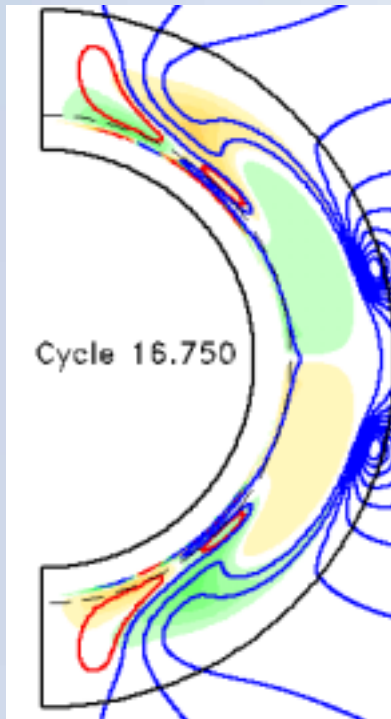
Ozone Recovery in the 21st Century

Global Average Total Ozone Column

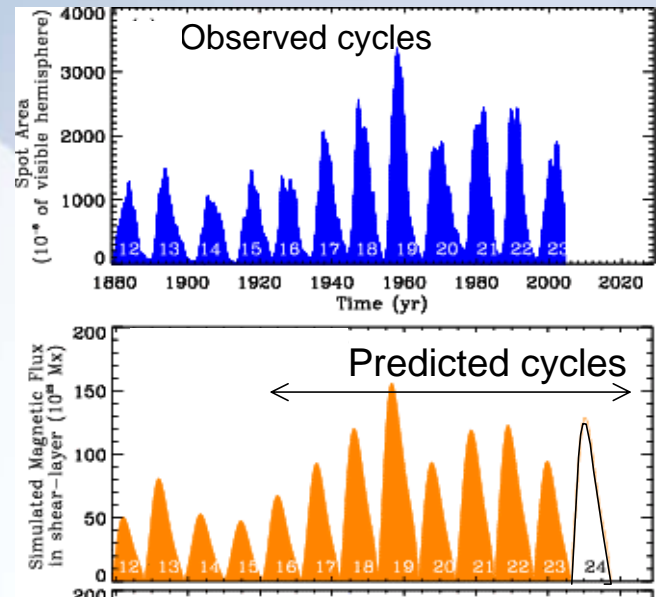


AR

Physics-Based Predictive Model of Solar Cycle Amplitudes



- ❑ Model incorporates poloidal, toroidal magnetic fields and meridional circulation
- ❑ Cycle 24 will be 30-50% bigger than cycle 23



(Dikpati, de Toma & Gilman, 2006, GRL, in press)

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Facility Highlights



NCAR

Our Progress – Investment in Science



State-of-the-art chemistry laboratory



Access Grids



Office and meeting space



HIAPER's new home at Jeffco

NCAR

Computing



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Modern Climate Model Simulations

NCAR's Bluesky Supercomputer: Characteristics of NCAR Model:

- 1600 Processors
- Peak speed: 8.3 Teraflops

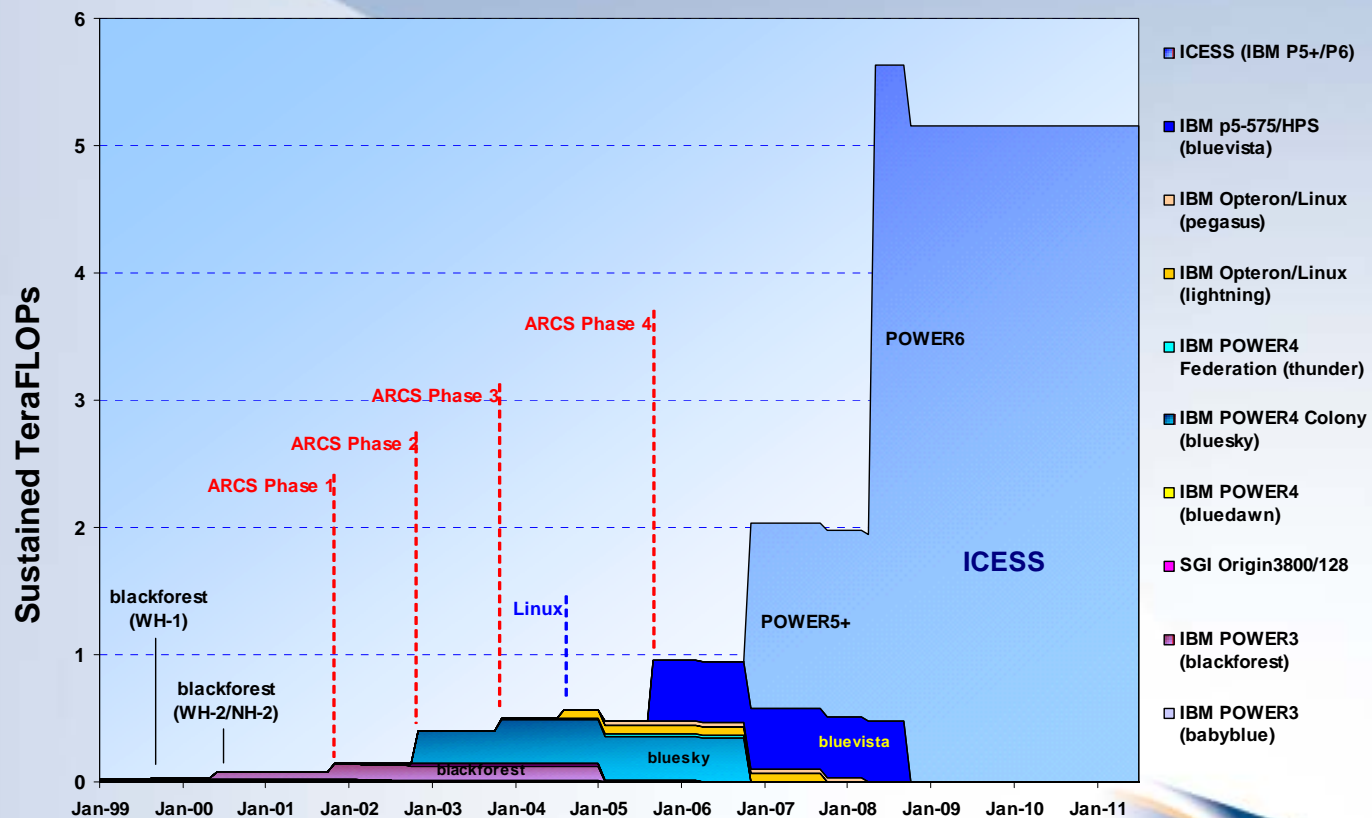


- ~1 quadrillion operations/simulated year
- UN IPCC ~10,800 years simulated
- Rate of simulation: 3.5 sim. years/day
- Output: 10 GB/simulated year
- Data volume for IPCC: ~110 TB (~200,000 Data CDs)
- Development effort: ~1 person-century



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Estimated Sustained TFLOPs at NCAR



Board Presentation, October 2006

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The TeraGrid is a facility that integrates computational, information, and analysis resources at the San Diego Supercomputer Center, the Texas Advanced Computing Center, the University of Chicago / Argonne National Laboratory, the National Center for Supercomputing Applications, Purdue University, Indiana University, Oak Ridge National Laboratory, the Pittsburgh Supercomputing Center, and the National Center for Atmospheric Research.

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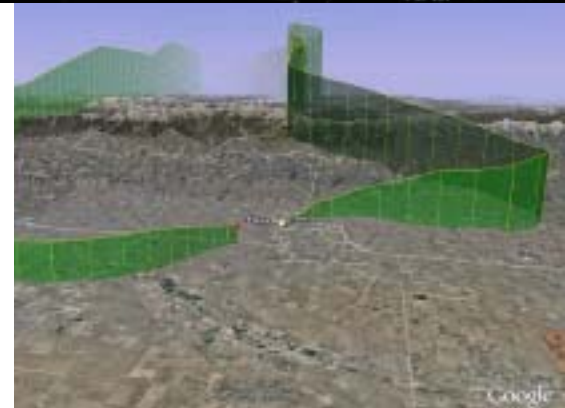
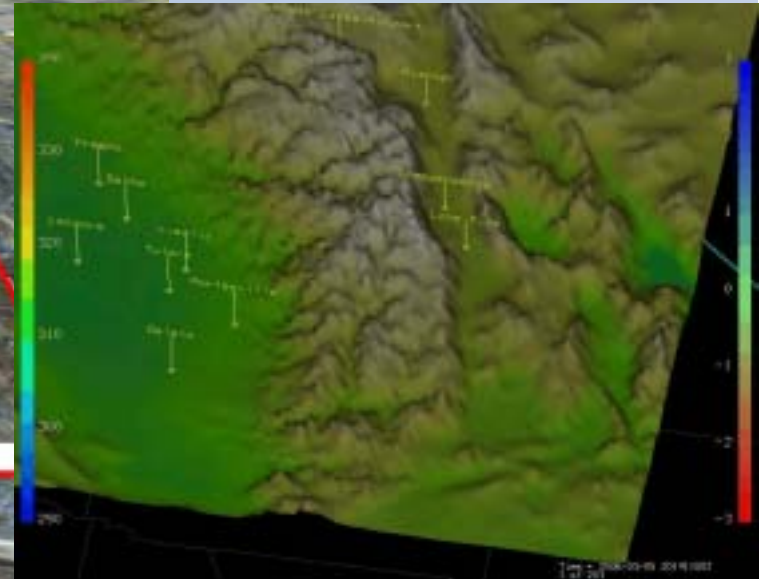
Capability Computing - 2009



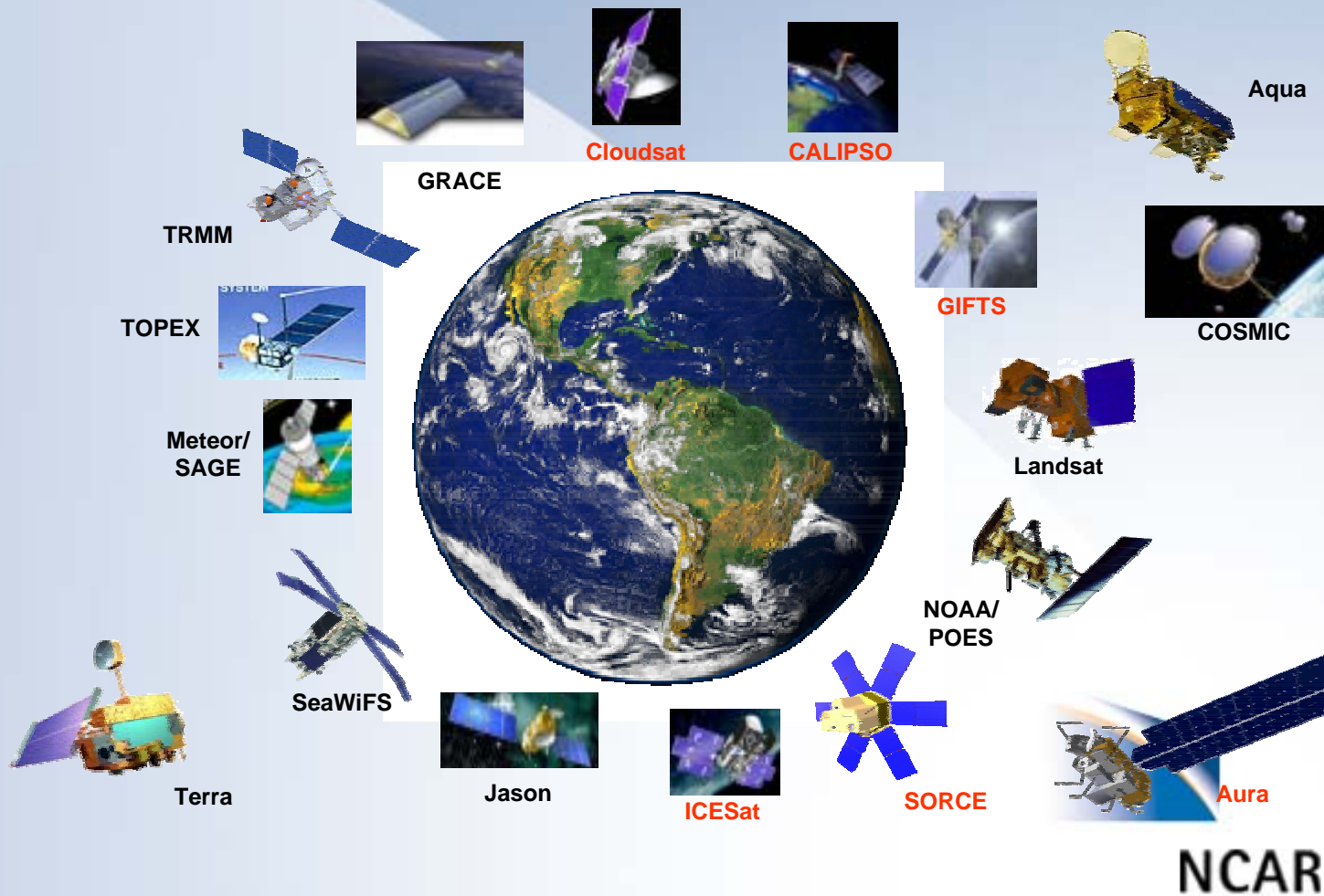
HIAPER



and displays



\$25 B in new satellite missions 2001-2007



Education



NCAR

5th NCAR Undergraduate Leadership Workshop

June 19-23

Gifted college juniors are nominated by faculty and convene in Boulder for 5 days, co-sponsored by universities and NCAR

Goals for students:

- Gain knowledge of state-of-the-art multi-disciplinary research, facilities, models, & technology developed and utilized at NCAR and NOAA
- Meet scientists who describe their research, career paths, and challenges encountered along the way
- Study models of leadership and consider importance of leadership in the sciences
- Establish a network of student peers from leading programs in the geosciences



20 students from 20 UCAR universities



http://www.ucar.edu/educ_outreach/ulw/

NCAR

ASP Graduate Visitor Program

Enhancing NCAR partnerships with other public and private

institutions

- New program in 2006
- Funds graduate student visits to NCAR for 3-12 months in order to conduct research in pursuit of their thesis
- Funding also available for advisor visit
- NCAR scientist applies on behalf of student and thesis advisor
- Received 24 applications. 19 Funded with 13 advisor visits



Graduate visitors and postdocs hiking during the ASP fellows' social in August 2006.

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International Postdoctoral Scientist Network for Earth Systems Science

Goal: To foster global collaborations among young scientists on integrative research to better understand the role of humans in perturbing biogeochemistry and climate.



First workshop in June, 2005 in Breckenridge, Colorado:
52 participants from 17 countries, including India, Bangladesh, Zimbabwe, Ghana, Nigeria, Argentina and Brazil

- 33 also attended CCSM workshop
- To meet at larger scientific meetings, e.g., AGU this year and another workshop in 2006

Funded by AIMES, NCAR-SERE, NCAR-ASP, NSF, MPI and participant organizations



Summary:

The Challenge of Simulating the Global Earth System



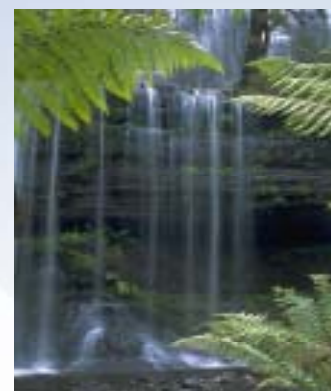
Atmosphere



Hydrosphere



Cryosphere



Biosphere

- The geosciences community is poised for petascale capabilities
- A balanced system is needed (cycles, software, data, networks, etc.)
- The system must address capability and capacity computing
- The societal and national need for such a system is growing