



NASA / The Visible Earth

# **NATS 101**

## **Introduction to Weather and Climate**

### **Section 3**

**Tuesdays and Thursdays 12:30 – 1:45pm**

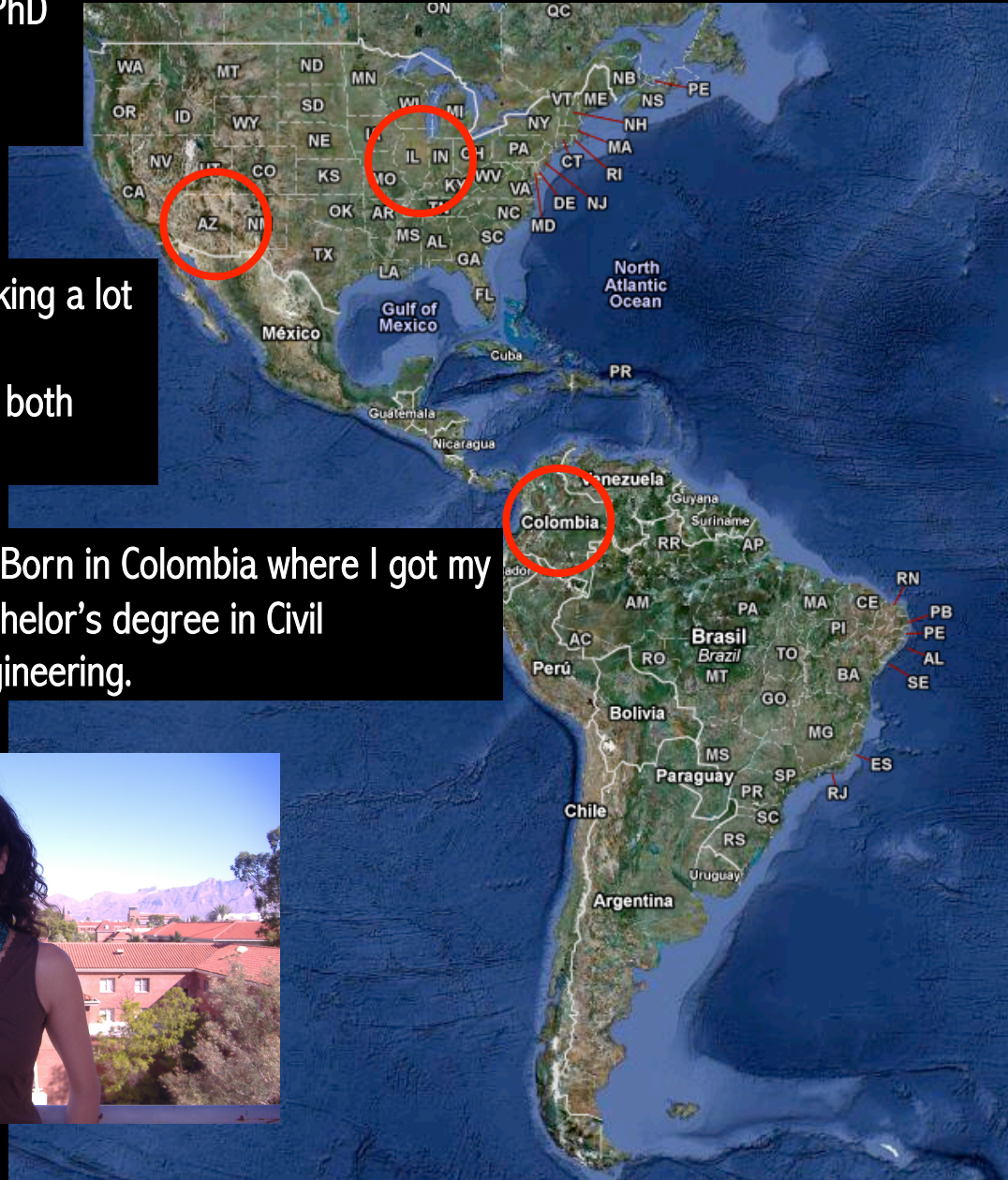
**Lecturer: Prof. Francina Dominguez, ATMO**

**TAs: Mason Quick and Xiang Zhang**

2 - I then got my Masters and PhD in Illinois - specialized in Civil Engineering Hydrology.

3 - When I moved to AZ I started working a lot in Atmospheric Sciences. Now I am a hydroclimatologist and a professor in both ATMO and HYDRO at the UofA.

1 - Born in Colombia where I got my bachelor's degree in Civil Engineering.



## Important Information

Office Hours:

Prof. Dominguez – T/W 1-2pm or by  
Appointment, PAS 586b [francina@hwr.arizona.edu](mailto:francina@hwr.arizona.edu)

Mason Quick – M/T 3-4pm

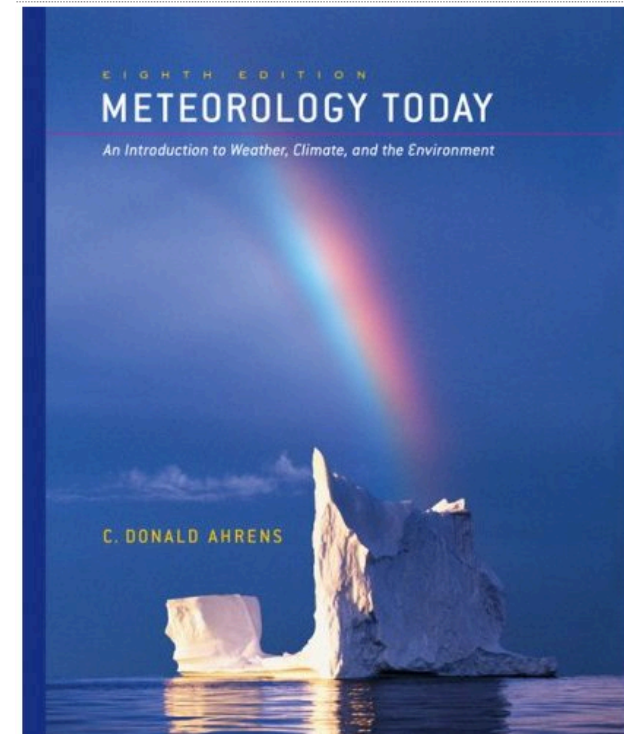
Xiang Zhang – TBD



## Important Information

### Required Text:

Meteorology Today:  
An Introduction to Weather,  
Climate, and the Environment,  
Eighth or Ninth edition by C.  
Donald Ahrens



### Required class materials:

PRS Electronic clicker  
device (available from UA  
bookstore).



## **Attendance Policy**

Attendance is mandatory, verified through the unannounced use of electronic devices and quizzes.

## **Student Behavior**

UA Code of Academic Integrity, Code of Conduct and Student Code of Conduct are enforced in this course. Every student is responsible for learning these codes and abiding by them.

<http://w3.arizona.edu/~studpubs/policies/ppmainpg.html>

Students can submit complaints online at

<http://web.arizona.edu/~dos/uapolicies/>

## Grading: Homeworks

- There will be **seven** homeworks throughout the semester, which are to be downloaded and printed off from the Course website by each student. Dates when they become available, and when they are due are listed on the website.
  - *Homeworks are due at the beginning of class on the dates shown.*
- The lowest score among the seven homeworks will be excluded from the course grade.
  - *Therefore, no late homeworks will be accepted.*

## Grading: Surprise Quizzes

- Throughout the semester, there will be surprise quizzes. These will consist of one simple question given at the end of class. Very short, 5 minutes max. Intended to reward class attendance.
- The two with the lowest scores will be dropped at the end of the semester.
  - *No makeup quizzes.*

## **Grading: Midterm Exams**

There will be three midterm exams. These will occur on ***February 9, March 9, and April 13***. These dates are listed in the course outline provided on the website.

Students who arrive late on midterm days will be not allowed to take the exam after the first student turns in her/his exam. No Exceptions

Exams may be curved depending on class performance.

The lowest score among the three midterm exams will be excluded from the course grade.

***Therefore, no make-up exams.***



## Grading: Final Examination

Section 3 (12:30 pm T/Th)

***Thursday May 13<sup>th</sup> from 11am to 1pm***

According to the University Examination schedule

No Exceptions per UA Policy

The final will be comprehensive, covering all material from the course. Consists of “review” questions on material covered in three exams.

## Grading Algorithm

- 30% Homework (lowest score dropped)
- 15% Surprise Quizzes and attendance (Quizzes 10% attendance 5%)
- 30% Midterm Exams (best 2 of 3 scores)
- 25% Final Exam

No Extra Credit Projects. No Exceptions.  
So Plan Accordingly!

## Course Grading

### Course Grading Scale

A	90% or higher
B	80.0-89.99%
C	65.0-79.99%
D	55.0-64.99%
E	< 55.0%

## Grading: Class participation

Will occasionally use electronic devices to ask review or survey questions during class

Course requirement to have, as will be using these to monitor attendance.

Available from bookstore Interwrite PRS clicker.

Participation grade based on the percentage of time a response is registered by a given student.

*“I FORGOT MY CLICKER” = YOU’RE ABSENT!!*



## **Lecture Notes:**

Notes for the lecture will be available in a printer-friendly pdf format after the lecture is over.

Instructor and students all show:

**Mutual Respect!**

What exemplifies respectful behavior?

No talking

Turn off cell phones/pagers/ipods...

No laptops

Arrive on time

Remain seated until dismissed



## Requirements

- Use scientific notation for writing numbers (especially rather large or small ones). For example, 1,000,000.0 should be written as  $1.0 \times 10^6$ . For example, 0.00006 should be written as  $6.0 \times 10^{-5}$ .

- Specify units of physical quantities (e.g. meters for elevation, etc.). Marks will be deducted if units are missing.

- Always show work. A correct number pulled out of a hat will NOT receive full credit!

Basic algebra will be needed for some problems in this class. If you have trouble understanding how to do these problems, seek help early!

## Announcement

**Course Homepage...on D2L**  
**<http://d2l.arizona.edu/>**

All information pertaining to this course is contained on the webpage.

Review problem sets and solution sets will be provided through the webpage.


You should immediately get a U of A account if you do not already have one so that you can access this website and take advantage of the U of A computing facilities.

All email correspondence to myself or the TA should be via your .arizona.edu email otherwise it risks being automatically deleted as spam mail.

# **Weather and Climate**

**Weather** is the condition of the atmosphere at a particular place and time.

- air temperature
- air pressure
- humidity
- clouds
- precipitation
- visibility
- wind



http://weather.noaa.gov/weather/current/KTUS.html

Ray's Knot Tutorials ISI Web of ...cience Home Apple Yahoo! Google Maps YouTube Wikip

National Weather Service  
Telecommunication Operations Center

Site Map News Organization

**Current Weather Conditions:**  
**TUCSON INTERNATIONAL AIRPORT , AZ, United States**

(KTUS) 32-08N 110-57W 786M

Conditions at Dec 23, 2009 - 04:53 PM EST  
2009.12.23 2153 UTC

Wind Variable at 7 MPH (6 KT)

Visibility 10 mile(s)

Sky conditions clear

Temperature 48.9 F (9.4 C)

Dew Point 27.0 F (-2.8 C)

Relative Humidity 42%

Pressure (altimeter) 29.92 in. Hg (1013 hPa)

ob KTUS 232153Z VRB06KT 10SM CLR 09/M03 A2992 RMK AO2 SLP120 T00941028

**Maximum and Minimum Temperatures**

Maximum Temperature F (C)	Minimum Temperature F (C)	
45.0 (7.2)	39.0 (3.9)	In the 6 hours preceding Dec 23, 2009 - 12:53 PM EST / 2009.12.23 1753 UTC
68.0 (20.0)	45.0 (7.2)	In the 24 hours preceding Dec 23, 2009 - 01:53 AM EST / 2009.12.23 0653 UTC

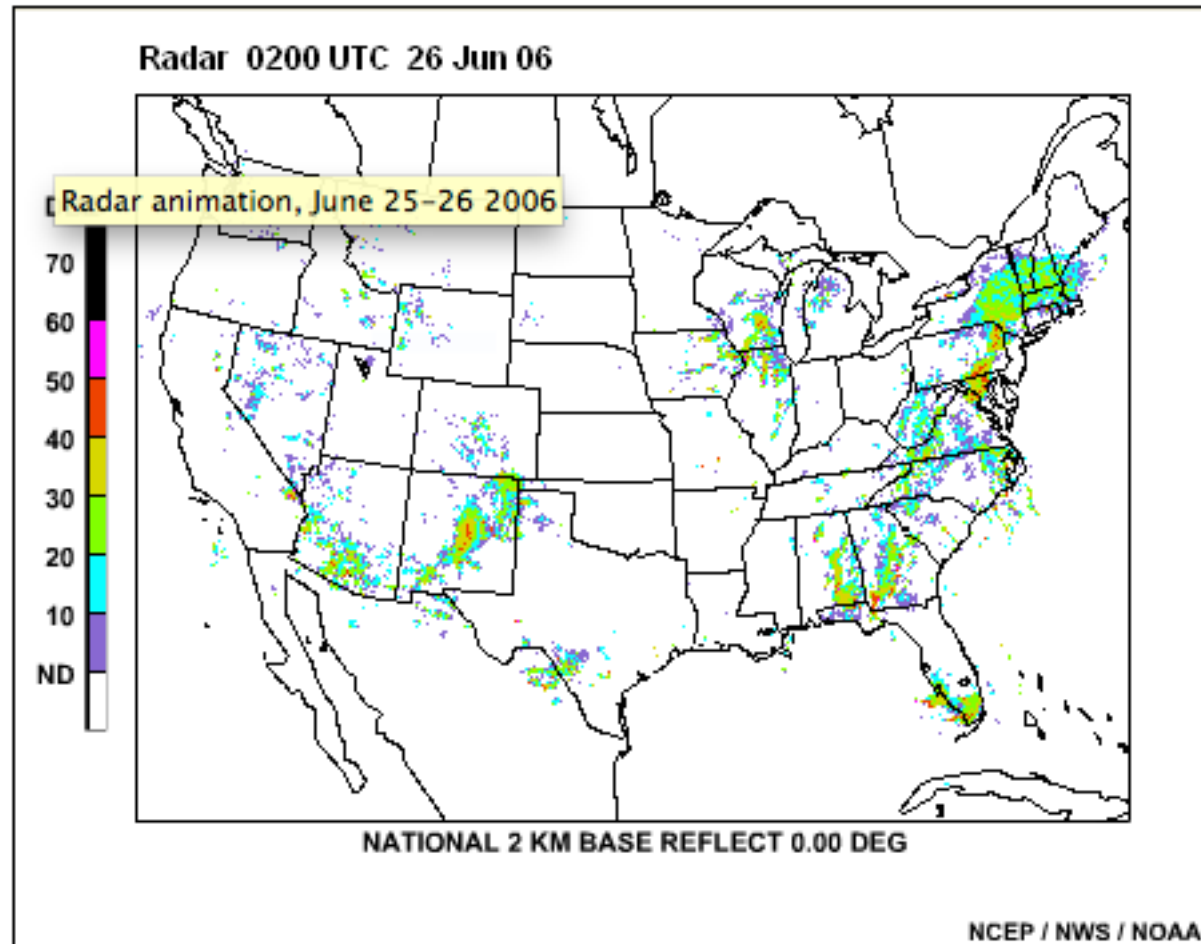
**Precipitation Accumulation**

Precipitation Amount

0.01 inches	In the 6 hours preceding Dec 23, 2009 - 06:53 AM EST / 2009.12.23 1153 UTC
0.15 inches	In the 24 hours preceding Dec 23, 2009 - 06:53 AM EST / 2009.12.23 1153 UTC

<http://weather.noaa.gov/weather/current/KTUS.html>

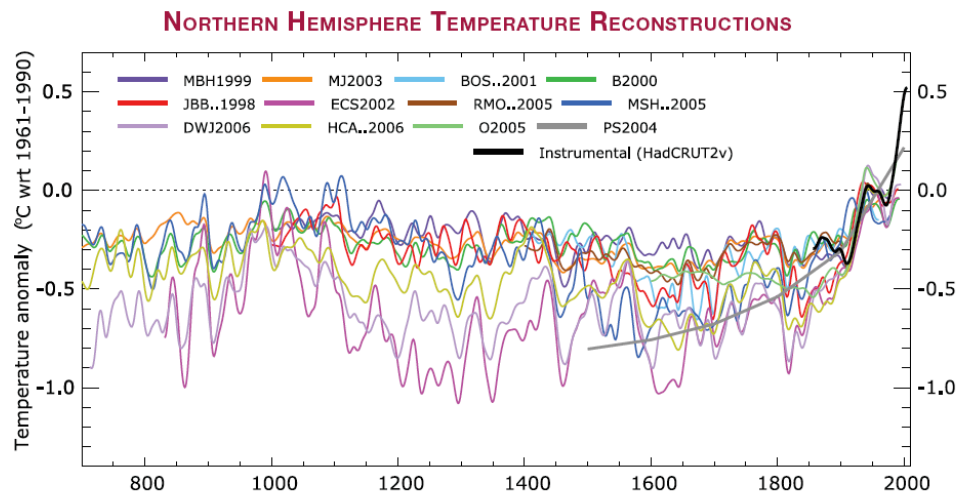
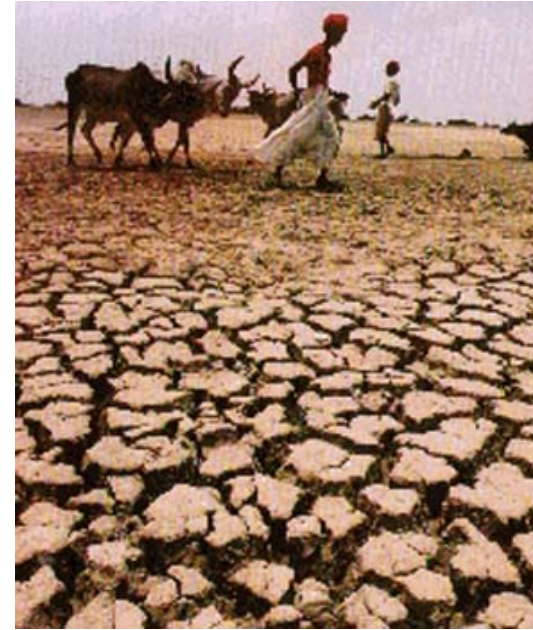
A familiar product to us is the radar representation of precipitation over the United States.



[http://radar.weather.gov/Conus/southrockies\\_loop.php](http://radar.weather.gov/Conus/southrockies_loop.php)

The “average weather” measured over a long time period is called **climate**.

Includes extremes of weather like heat waves or cold spells



Climate change studies are at the forefront of science.



## **“Climate Change” in the news.**

Each class will begin with a small news update or clip regarding climate change.

While it has lately been reported “everywhere” climate change is not a new idea.

1958: Frank Capra *The unchained goddess*



**2009 ended with the Copenhagen Summit** – where the US and China played a key role.

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**NEWS** Watch ONE-MINUTE WORLD NEWS

Page last updated at 06:40 GMT, Saturday, 19 December 2009

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### Key powers reach compromise at climate summit

Key states have reached what they call a "meaningful agreement" at the Copenhagen climate summit.

Five nations, including China and the US, reached a deal on a number of issues, such as a recognition to limit temperature rises to less than 2C.

US President Barack Obama said it would be a foundation for global action but there was "much further to go".

However, the deal could be rejected as a number of nations expressed "dissatisfaction" with the contents.

"Can I suggest that in biblical terms, it looks like we're being 30 pieces of silver to sell our future," Tuvalu's lead negotiator Fry said during the main meeting. "Our future is not for sale."

President Barack Obama: "We know progress alone is not enough"

CLICK TO PLAY

00:00 / 01:03

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## Copenhagen climate summit: global warming deal on knife-edge as President Barack Obama arrives

A new leaked document has cast doubt over the Copenhagen climate change conference just as President Barack Obama arrived.

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Page last updated at 16:33 GMT, Tuesday, 22 December 2009

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### Why did Copenhagen fail to deliver?

About 45,000 travelled to the UN climate summit in Copenhagen - the vast majority convinced of the need for a new global agreement on climate change.

So why did the summit end without one, just an acknowledgement of a deal struck by five nations, led by the US.

And why did delegates leave the Danish capital without agreement that something significantly stronger should emerge next year?

Our environment correspondent Richard Black looks at eight reasons that might have played a part.

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OPINION

### Meg Whitman's climate change strategy

In what may be a risky political move, the GOP candidate for governor has come out strongly against the state's law on regulating greenhouse gas emissions.

ADS BY GOOGLE

**Does Obama Deserve a B+?**  
Mitt Romney Isn't Sure Let us know what you think  
www.FreeStrongAmerica.com

**Make an Impact in 2010**  
On-line Workshop Action on Climate Change! Early bird sale ends Jan 14  
www.sustainabilityprofessionals.org

By Phil Trounstine and Jerry Roberts  
January 11, 2010

E-mail Print Share Text Size

Although a 12.3% unemployment rate and \$20-billion budget deficit ensure the economy will dominate California's race for governor, Republican front-runner Meg Whitman has guaranteed that the environment will also be a high-profile issue in the campaign.

Whitman, the former CEO of EBay, declared in September that her first act as governor would be to suspend the state's pioneering climate change law, AB 32. It was a high-risk political move for Whitman, putting her campaign at odds with the views of a large majority of California voters while, more

It was seen as a failure because:

- 1 – It was hoped that global emissions peak by 2020, however, the agreement was “as soon as possible”
- 2 – It was hoped that there would be a binding agreement of maximum temperatures change of 2°C by end of century, however there were no binding agreements – just loose language.
- 3- The 50% cuts of global emissions by 2050, was taken off the table.