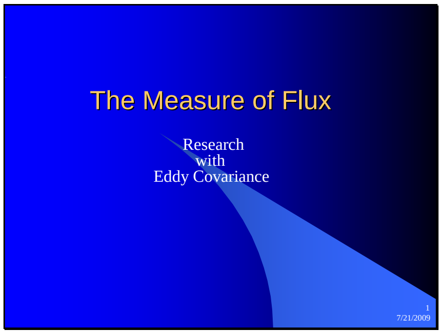
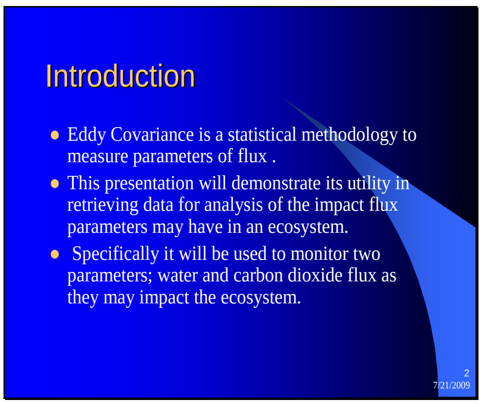
Slide 1




***NJCCCS:*** 51Aff;552A1,52B1;
52B2;52B3;51B2;54*ff*.

Slide 2




1. A method to describe flux in the parameters of interest in the sampling area in the environment.
2. A question to study is raised; for example: ***do carbon dioxide and water aerosols flux together in the environment.***
3. Explain why this question is important: ***these are vital components needed in photosynthesis and vary within gradients established inorganically.***
4. The method standardizes the variables in order to compare them.
5. Analysis of results allows the formulation of an hypothesis: ***plants increase the surface density of these gases to increase flux, how does other extraneous sources of these gases change the flux pattern.***

**NJCCS:** 51A1;51A3;51B2;52A1;
55A1;51A2;51B1;54A1;54C1;54A1

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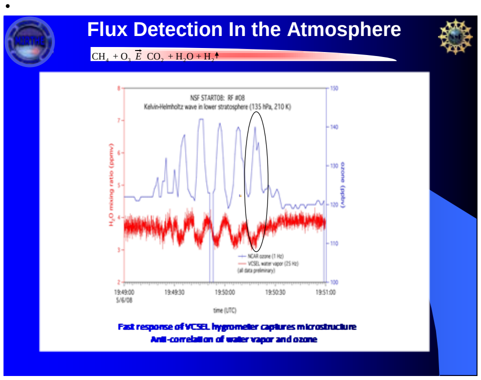


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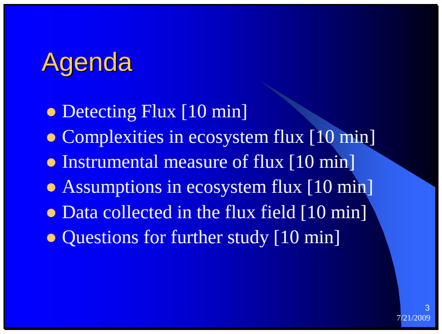
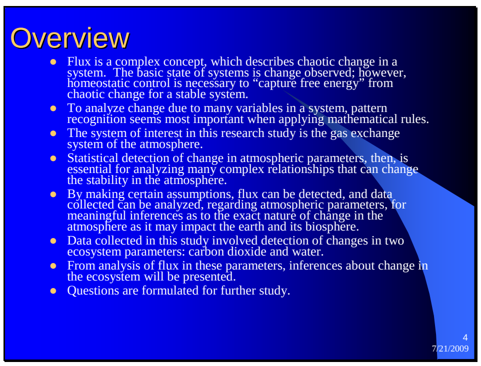
Slide 3

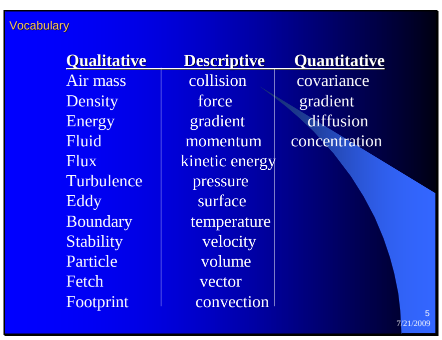



Slide 4




**NJCCCS:**
51A3;51A4;51B1;54A1;
54C1

Slide 5



Slide 6

## Topic One:Detecting Flux
## A. What is Flux

- *Qualitative definition*: **flux,** in the atmosphere, is the mixing of fluid particles within boundaries based on turbulence in the density of these fluids in the density of the air mass that contains them. These turbulent flows are called ***eddies***, which have certain energy based on density changes [gradients] affected by the **fetch** in which they distribute from the **footprint which is** their source in the atmosphere.

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Slide 7

Detecting Flux
A. What is Flux?

- *Descriptive definition*: ***flux of particles*** specifically is the vector resolutions that move particles with certain kinetic energy in the space of motion and pressure of the volume that contains their mass – their density. Based on their densities, they distribute in the field of flux in gradients with a certain velocity.
- The distributing velocity is due to collisions along their surfaces with some force and frequency in the momenta of these collisions, and gives the ***field strength*** to the flux of particles; according to velocity and surface area

$$\frac{v^2}{(SA)^2}$$

- The distributing particles of interest in the atmosphere are gases, so they follow the gas laws, and are influenced by other complex changes, as they are engaged in energy transformations in convection, in forming their gradients of distribution, in the atmosphere.

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Slide 8

## Detecting Flux
## A. What is Flux

- *Quantitative definition*: the typical particle movement depends on the concentration, or the density, of the particle within a certain space in the atmosphere. Concentrations vary due to the variation in the gradient of particle densities in the atmosphere. These variations occur by intrinsic factors of diffusion, or by more complex interactions that involve energy transformations and have many variables which influence the flux [change] in concentrations within the atmosphere. This complex interactivity requires a statistical measure of the variables, which together, are thought to influence fluctuating concentrations of a particle – **covariance**.

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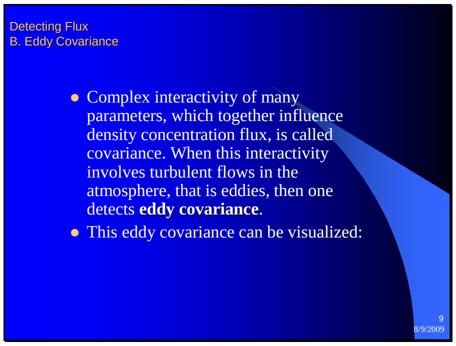
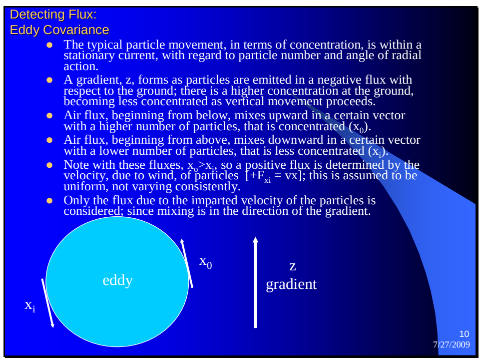
Slide 9




**NJCCS:** 51A1;51B2;51C1;
54ABC;53C1.

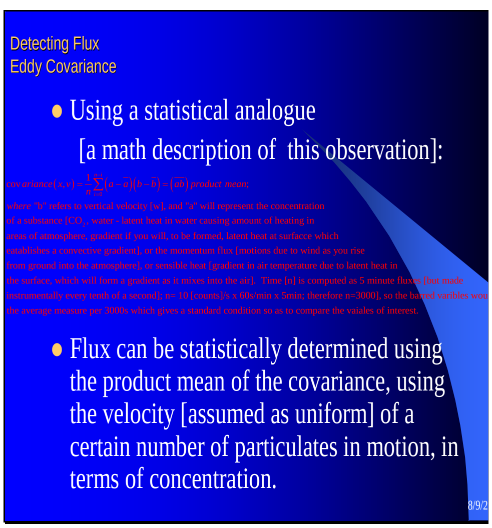
Slide 10



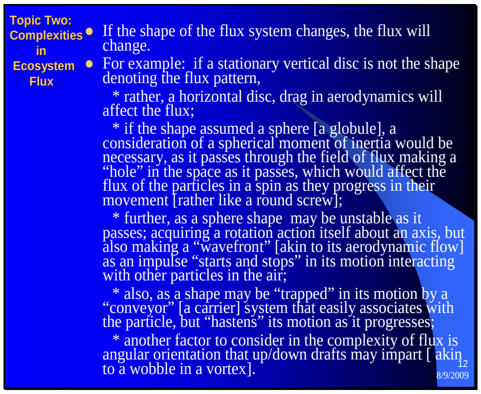

1. Explain the geometry of the disc model of the eddy.
2. Explain the mathematics of turbulence which affects the eddy.
3. Explain the divergence of density to form a concentration gradient.
4. Explain the movement within a diffusion gradient.

**NJCCCS:** 53B1;53C1;53D1

Slide 11



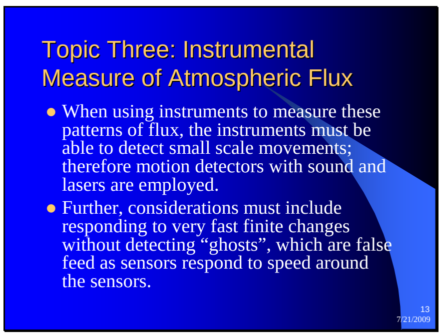
Slide 12




**NJCCCS**: 51A2;51A3;51A4;81A*ff* 81B12345789;52A1; 82B13

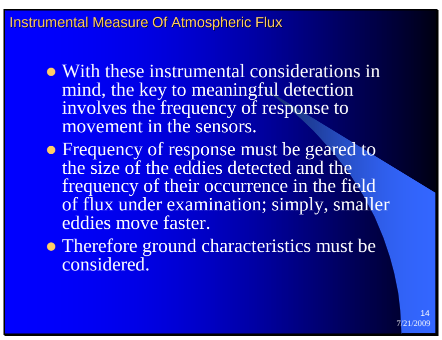
1. In lab groups, discuss the idea of eddy covariance.
2. In lab groups, discuss possible sources of error.
3. Devise a group plan to study the parameters of interest.
4. Present your research and plan.

Slide 13




1. Plans will be critiqued based on the following slides.
2. A finished research document will be formulated.

Slide 14



Slide 15

## Instrumental Measure of Atmospheric Flux

- This is to say, considerations must be made to the roughness of the ground below the vertical uplifts, gradients [$z_0$], and the height at which the eddies in them will be formed so as to measure them.
- Specificaly,the mean divergence [z(div)$z_0$]
- A maximum divergent area seems to give larger particle flux, and, therefore, easier detection by the sensing probe.
- So, using ultrasonic sensors, which react to breaks in the flow, are standardized motion detectors to a *f* = 1-100Hz.

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Slide 16

Topic Four:
Assumptions in Detecting Atmospheric Flux

- Detection assumes a stationary current of particle flow, with respect to number and orientation.
- Detection, further assumes finite aerosols [colloidal spheres], rather than a continual change in number and orientation of these particles.
- Optical Particle Counters are employed.

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Slide 17

Topic Four: Assumptions in Detecting Atmospheric Flux

- These instruments are standardized by a known aerosol fluid of some concentration breaking a laser beam as the flux pattern crosses; pulses of such scattered light are counted, and computer algorithms process these counts using the covariance statistical method to obtain raw data.
- Weather parameters must be recorded in order to analyze the data generated; for example, fog, which demonstrates the Tyndall Effect of an homogenous mixture of particles.
- Other considerations controlled: the stability of the plane of cavity [instrument detection area], the velocity of flux, deposition of aerosol in the cavity, natural and extraneous fetch and footprint, horizontal advection [this causes flux in concentration gradients as eddies mix], vertical movements caused by thermals and rain diminish vertical flux patterns.
- Control is effected through instrumental rotation with respect to flux patterns to correct for wind movement, background flux patterns are statistically normalized with a Fourier Transformation of raw data.
- A still day with low: wind movement, heat, and humidity, constitute the best conditions for instrumental detection of flux patterns in atmospheric parameters.

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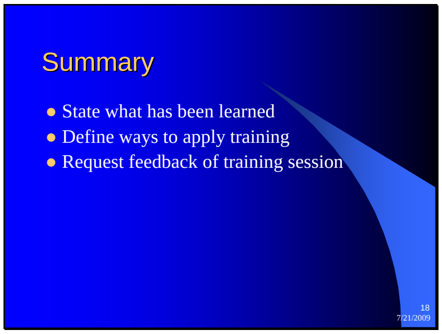
Slide 18




Slide 19