

AT605 Syllabus:

# **An Introduction to the Global Circulation of the Atmosphere**

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2021 version

## **Perpetual Motion**

An introductory outline of the course, including a summary of how it relates to other Atmospheric Science courses.

## **What Makes It Go?**

A summary of upper and lower boundary conditions that affect the global circulation of the atmosphere, including the planetary energy budget, the surface energy budget, the atmospheric energy budget, land-sea contrasts, topography, etc.

## **First Impressions**

An introductory overview of the observed global circulation of the atmosphere, with a small amount of conceptual interpretation. Topics covered include the distributions of sea-level pressure, winds, temperatures, and moisture.

## **The Rules of the Game**

A brief but intense review of topics in atmospheric dynamics that are needed in later chapters.

## **Go with the Flow**

A discussion of the meridional transports of energy, moisture, and angular momentum, as seen in isentropic coordinates.

## **Up Moist, Down Dry**

A discussion of the role of cloud processes in the global circulation of the atmosphere.

## **Heat Where It's Hot, and Cool Where It's Cold**

A summary of the energetics of the global circulation of the atmosphere.

## **A Taxonomy of Eddies**

An overview of the many types of eddies that are observed in the global circulation. Topics covered include midlatitude Rossby waves, equatorially trapped waves, and monsoons.

## **What the Eddies Do**

A summary of the effects of the eddies on the zonally averaged circulation. Topics covered include several forms of the Eliassen-Palm theorem.

## **A Fluid Dynamical Commotion**

A perspective on the global circulation as a form of large-scale turbulence.

## **The Future of the Circulation**

A brief discussion of future changes in the global circulation that are expected to result from increasing greenhouse gas concentration.s