

# ATS 780 – African Storms

## Spring 2026

### Course Description:

This course will focus on the morphology and distribution of storms over Africa, their microphysical and dynamical characteristics, and the impacts of synoptic, mesoscale and land surface processes on these storm systems.

### Course Objectives:

The primary objectives of this course are to:

1. describe the distribution of convective storms over the African continent;
2. explain the role of synoptic, mesoscale and land surface processes in determining the distribution, morphology and intensity of African storms;
3. describe the cloud microphysical and dynamical processes that characterize the different storm morphologies and the severe weather that they produce;
4. assess the manner in which changing climates will impact African storms; and
5. describe the current impacts of African storms and their climate-induced changes on African populations and communities.

### Course Outline:

1. Introduction (1 class)
2. Geography of Africa (1 class)
3. Weather and Climate Challenges (2 classes)
4. Observational and Modeling Platforms (2 classes)
5. Cloud Climatology (1 class)
6. African Jets (1 class)
7. Tropical Temperate Troughs (2 classes)
8. Fog (2 classes)
9. Thunderstorms, Lightning and Hail (5 classes)
10. Tornadoes (2 classes)
11. Mesoscale Convective Systems (4 classes)
12. Tropical Cyclones (2 classes)
13. Cold Pools and Haboobs (3 classes)
14. Aerosols (1 class)
15. Conclusions (1 class)

### Instructor:

Professor Susan C. van den Heever

Email: [Sue.vandenHeever@colostate.edu](mailto:Sue.vandenHeever@colostate.edu)

### Meeting Times:

Tuesdays and Thursdays: 10-10:50am, ATS101

Makeup Classes: Tuesdays and Thursdays: 11:00-11:50am, ATS101

**Prerequisites:**

- ATS601, ATS620, ATS640 or ATS641
- PhD students, or MS students with written consent of the instructor

**Required Textbooks:**

There is no required textbook for this class.

Course notes will be distributed for the class via the website:

<http://vandenheever.atmos.colostate.edu/vdhp/ats780/ats780.php>

Username is 780notes. The password will be distributed in class.

**Course Structure, Expectations, and Grading Criteria:**

- The class will meet online for two 50-minute periods each week as indicated above.
- The course material will be delivered through instructor lectures, student analysis and presentation of current literature, and in-class discussions.
- At least 4 hours of effort (2 hours per each hour of class time) outside of class each week are expected to complete associated readings and presentation assignments.
- The literature analysis and presentations, together with your participation in the class discussions, comprise your grade as shown below.
- There are no exams in this course.

**Final Grades:**

Your final grade will be weighted as follows:

Literature analysis and Presentations: 90%    Class Participation: 10%

**Academic Integrity:**

All students are subject to the policies regarding academic integrity found in the 2025 – 2026 General Catalog, found at <http://catalog.colostate.edu/general-catalog/policies/>, and the student conduct code (<https://resolutioncenter.colostate.edu/conduct/code/>). Examples of academic dishonesty can be found in these sources. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

**Special Needs:**

Please see the instructor during the first two weeks of the semester, if you have special learning needs that should be accommodated in this class, and refer to

<https://disabilitycenter.colostate.edu/> for more information.