Modeling the Path of a Hurricane

The Linear Motion Approach

Objectives

- Determine map scale for NOAA’s Atlantic Hurricane Tracking Chart.
- Plot hurricane positions using data from Unisys Weather data site.
- Describe the path of a hurricane using a linear equation.
- Predict the distance a hurricane travels using a linear equation.
- Extrapolate future positions of a hurricane.
- Test predicted positions against actual track data.
- Discuss possible ways to improve the model.

Websites and Materials

- Unisys Weather at http://weather.unisys.com/hurricane/atlantic/
- NOAA’s Atlantic Hurricane Tracking Chart at http://www.nhc.noaa.gov/AT_Track_chart2.pdf
- Pencil
- Ruler
- Calculator (optional)

Preparation

Obtain track data for a storm from the Unisys Weather website. Record the name and year of the storm.

Name_______________ Year__________

Determine Map Scale for NOAA’s Atlantic Hurricane Tracking Chart (AHTC)

Using a ruler, measure the distance between 10 and 15 degrees latitude.   (1) ________ mm

Divide answer (1) by 5 degrees.   (2) ________ mm/deg

There are 111 km/deg in latitude, so divide 111 km/deg by answer (2).   (3) ________ km/mm

Record the scale on the tracking chart.

Plot hurricane positions using data from Unisys Weather data site

Take out the track data sheet and find the STAT field column. Look down this column and find when the storm first reached HURRICANE strength. Circle the corresponding data under LAT, LON, TIME.

Plot the latitude and longitude on the AHTC and write the time above the point you made.

Repeat for a second position for a time 24 hours later.

On the map, draw a straight line connecting the two points.

Measure the length of the line. Use your map scale from (3) and record the distance.   (4) ________ km
Describe the path of a hurricane using a linear equation

Calculate the speed of the hurricane by dividing (4) by the time, 24 hrs. (5) _______ km/hr

Write an equation that can be used to predict the distance this hurricane would travel given an arbitrary time. (6) ______________

Predict the distance a hurricane travels using a linear equation

Using your distance equation from (6) predict the distance the hurricane will travel over the next 24 hrs, 48 hrs, and 72 hrs

24 hrs (7) _______ km
48 hrs (8) _______ km
72 hrs (9) _______ km

Extrapolate future positions of a hurricane

Using the map scale, convert km back to mm.

24 hrs (10) _______ mm
48 hrs (11) _______ mm
72 hrs (12) _______ mm

Place your ruler back on the AHTC and re-align it with the line you drew. Using your values from (10-12) measure out to these new positions and draw a straight-dashed line.

Test predicted positions against actual track data

Look back at the tracking data. Starting from the last point you circled, plot the latitude and longitude on the AHTC for the next 24 hrs, 48 hrs, and 72 hrs.

Does the hurricane track North or South of your prediction?

Discussion

If the hurricane tracked north of your prediction, do some research to explain why.

How could you improve your model?

The next part in this series will investigate parabolic equations as a way to model the path of a hurricane.

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