

Ionosphere Lab: Global Structure Module

Introduction

In this module you will look at the global structure of the ionosphere and the features there in. You will use simulation results from the CTIPe model driven by artificial conditions. (<http://ccmc.gsfc.nasa.gov/models/modelinfo.php?model=CTIPe>).

Suggested: *This module should be done after “Ionosphere Lab: Chapman Layers Module”*

After you are finished you should understand:

- the global structure of the ionosphere layers
- the drivers that generate the structure of the layers

Getting Started

- On the CCMC Education page, navigate to the ionosphere “artificial conditions” runs. Choose the [CTIPe Solstice quiet \(low altitude: 80 - 500 km\)](#) run.
- Click on “Update Plot”. You should see a world map showing the a color map of the electron density at a fixed altitude.
 - **Describe the features you see in this map.**
Where is the peak in the electron density?
Why is it there?
 - **What time of year is it? How can you tell?**
 - **What features do you see at the poles?**
 - **What physical drivers are responsible for the features you see?**

Global Structure at Various Altitudes

- Scroll down to “Choose Plot Area”. Near the bottom on the right hand side, click the “H = Constant” radio button and enter the value for the E-layer maximum that you have previously explored. (If you are doing this as a stand alone module, use “150 km” as the value for the E-Layer height). Click “Update Plot”.
 - **Note the maximum value for the electron density.**
 - **Also note the value in “auroral” region.**
- Change the height to the F-Layer. (Try 275 Km if you don’t know)
 - **What structures do you see in the F-Layer?**
Are they the same structures seen in the E-Layer?
 - **What is the driver for these structures?**

Summative Activity: A Real Event

On the CEDAR Challenge page

(http://ccmc.gsfc.nasa.gov/ungrouped/extras/CETI_metrics.php)

you will find an number of runs for various events using different models. Choose one event (try the December 2006 event) and choose two different model runs for that event. Try to match the conditions and compare the model results.