

## GRIB Explorer for iPad

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User guide

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## GRIB Explorer for iPad

### First Launch



Launch GRIB Explorer on your iPad.

On first launch you will be prompted to enter your account Username and Password and then tap the Sign In button. If you do not already have an account from OCENS you can register for one at

[www.OCENS.com/ige](http://www.OCENS.com/ige).

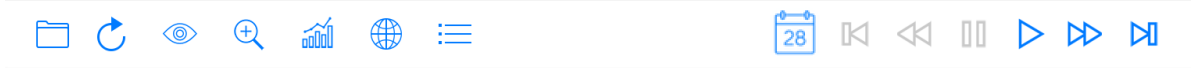
*If you would just like to try the software you can do so by just tapping the Samples button to open sample GRIB files for viewing. If you would like to download live data you can enter any preferred Username and Password that you want. This will activate a demo account that will be good for 24hrs.*

After tapping the **Sign In** button you will see what is known as the [Select GRIBs](#) screen that will allow you to set your Connection Method as well as select the files that you want to download.

A screenshot of the GRIB Explorer Plus app interface on an iPad. The screen has a light blue background. At the top, the status bar shows 'iPad', signal strength, '11:44 AM', and '42%' battery. The app title 'GRIB Explorer Plus' is centered in bold black text. Below the title are two input fields: 'Username' with a placeholder 'Enter username' and 'Password' with a placeholder 'Enter password'. Below these fields are two blue buttons: 'Sign In' and 'Samples'. At the bottom, there is a link that says 'Need help from customer support?'. A virtual keyboard is visible at the bottom of the screen, showing letters Q through P on the top row, A through L on the second row, and Z through M on the third row, along with function keys like '123', 'Globe', 'Microphone', and 'Done'.

## Tool Bar

Lets look over the various items on the GRIB Explorer tool bar.



### File folder

This contains the GRIB files that you have downloaded as well as a section of sample files for you to work with.

*You will notice that of the files you have downloaded there is the one combined file (labeled 'GRIB\_date\_x.grb'). The other single product files start with the model and type of file in the name.*

### Refresh tool

Should your images need to be refreshed you can tap this.

### View tool

This will allow you to turn on and off the following:

- **The Color Palette**

When this feature is on you can reposition the graph by dragging it to a different location on the screen. To change what parameters are being referenced select the title and then select what you want from the available choices.

- **Cursor Position indicator**

This is displayed near the top of your screen showing the lat/lon of the cursor as well as the range and bearing from your home location to the cursor. This can also be turned on an off from the [Preferences](#) screen.

- **On Screen Cursor Values**

This displays a box just above your cursor showing the lat / lon and values for the data that is being displayed on the map at that position. This can also be turned on an off from the [Preferences](#) screen.

- **Home Location**

When this is on your home location is updated using data available from your device and displayed on the map.

### Zoom

This tool provides a quick way to scale your image to the window. [More: How do I zoom?](#)

### Graphs

- **Route Finder**

*The route finder profile is a plot of the values of the main weather parameter located on a great circle line between two arbitrary points on the chart. You can move either points in any direction by holding the left mouse button and dragging to the desired new point. The route finder profile works for both single frame and animated charts. [More: What is the Route Finder tool?](#)*

- **Time Profile**

*The time data profile is a plot of the values of the main weather parameter located at the mouse position through time. As you move your mouse position, a new time plot is displayed. The time data profile works for multiple time frame GRIB charts. [More: What is the Time Profile tool?](#)*

- **Trip Planner**

*The route finder profile is a plot of the values of the main weather parameter located on a great circle line between two arbitrary points on the chart. You can move either points in any direction by holding the left mouse button and dragging to the desired new point. The route finder profile only works for multi frame charts. [More: Can you explain to me what's happening inside the Trip Planner tool?](#)*

- **Thermocline**

*GRIB Explorer provides global access to sub-surface temperature data down to 1000 meters. These are individual files you can download. It also offers a **Thermocline** product which combines all those layers into one file so you get a complete picture of subsurface conditions around you. The Thermocline tool shows you the depth of the mixed layer in the ocean. [More: What is the Thermocline tool?](#)*

## **Map Outlines**

*Here you can turn on and off various features of the map display.*

## **Plotting GRIBs**

*This menu allows you to turn on and off the various GRIB data that you currently have layered.*

## **Select Frame**



*This menu allows you to go directly to a time frame in the file you are viewing.*

## **Player controls**

*These tools allow you to control the animation of the GRIB data frames.*

## Data Display

Below the top menu bar you will see data fields that are related to the cursor position.

	46° 50.787' N	252.1 nm	MSL pressure:	1021.3 mb		47° 23.901' N
	128° 25.534' W	265° T				122° 19.464' W

This data includes:

### Finger Position indicator icon

- You can touch this icon to toggle this feature on (solid blue) and off (blue outline). When this feature is on you will see the following:
- Cursor lat/lon.
- Range and Bearing to cursor from home location.
- A variety of values based on what data you are viewing and the finger pointer position on the map.
- Home Location Indicator icon. You can touch this icon to toggle this feature on (solid blue) and off (blue outline).
- Home locations lat/lon.



Active Cursor Position shown on map



Active Home Location shown on map

## Screen Bottom Buttons



The buttons on the bottom of the screen will take you to the various screens.

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## View GRIB



The **View GRIB** button takes you to the main page to view downloaded files

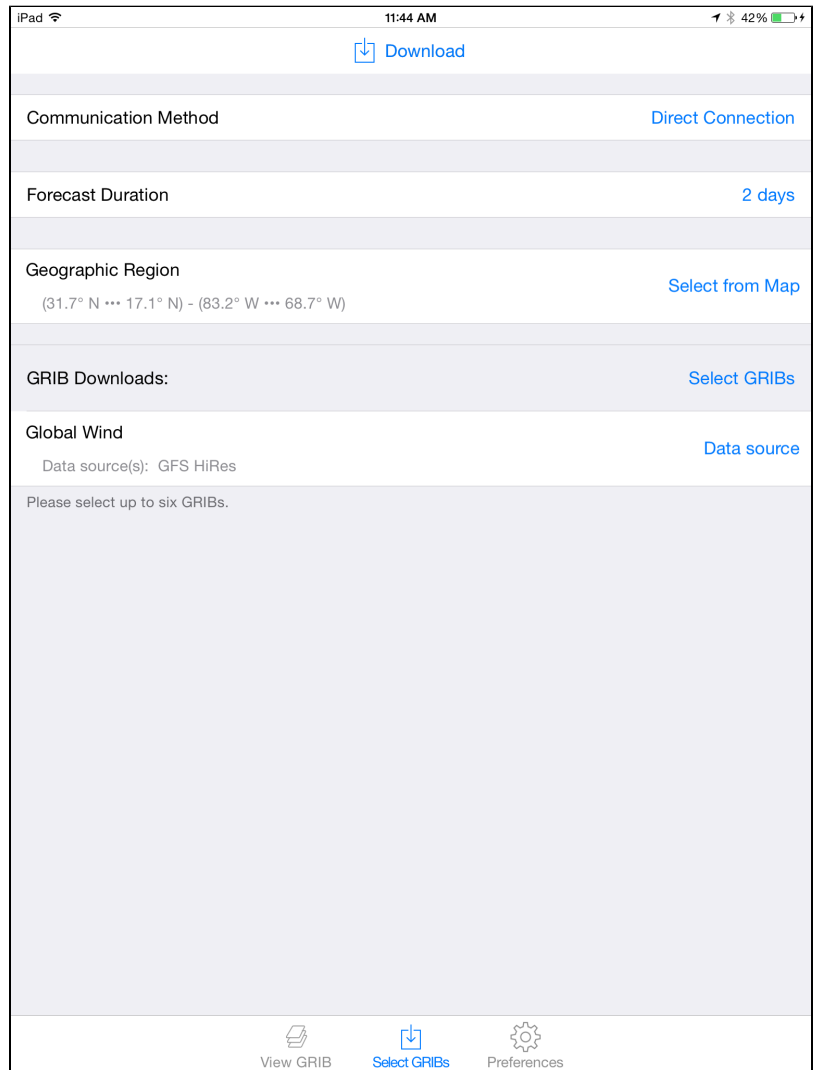


## GRIB Explorer for iPad

### Select GRIBs



The **Select GRIBs** button takes you to the page that allows you to set your [Connection Method](#) as well as select the files that you want to download.

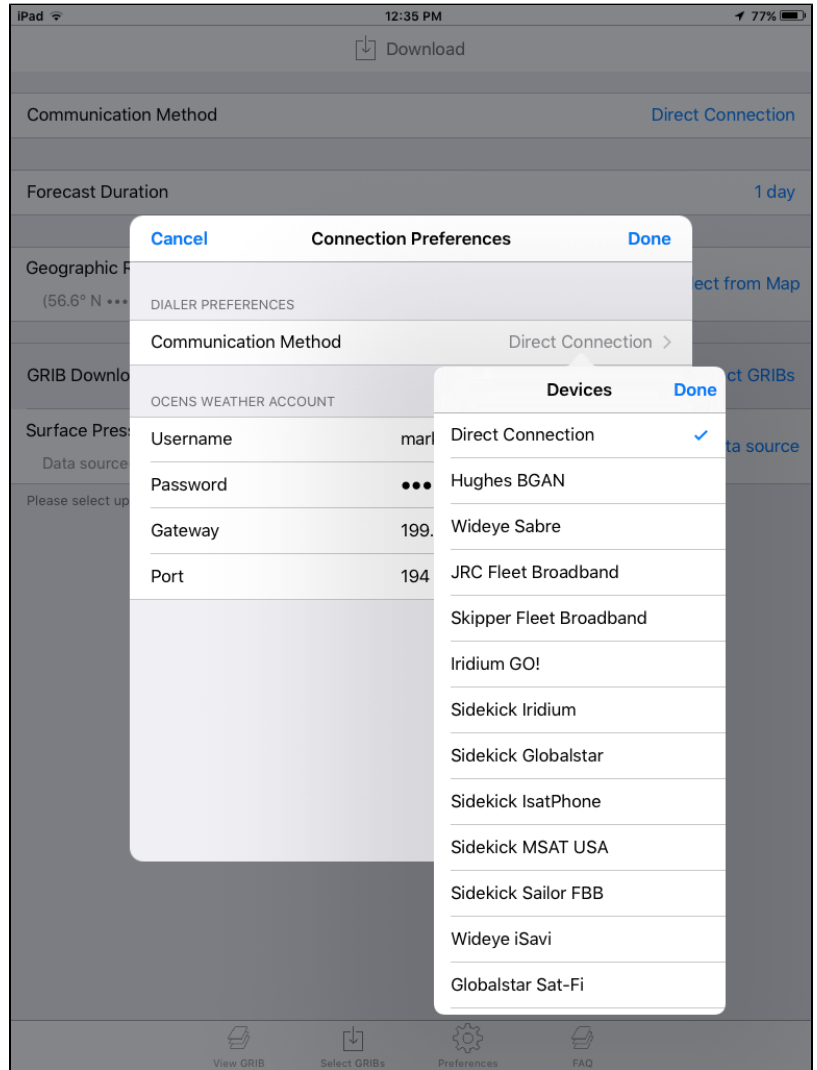


## Communication Method

Tapping on the Communication Method line will take you into the Connection Preferences screen. You can change the Dialer Preferences by tapping on the Communication Method line and then selecting your Device and tapping “Done” in the upper right corner.

*For standard or always on Internet connections choose the Direct Connection. If you are choose any of the other devices you may see additional default information appear – leave these default settings unless directed to make a change by OCENS support personnel.*

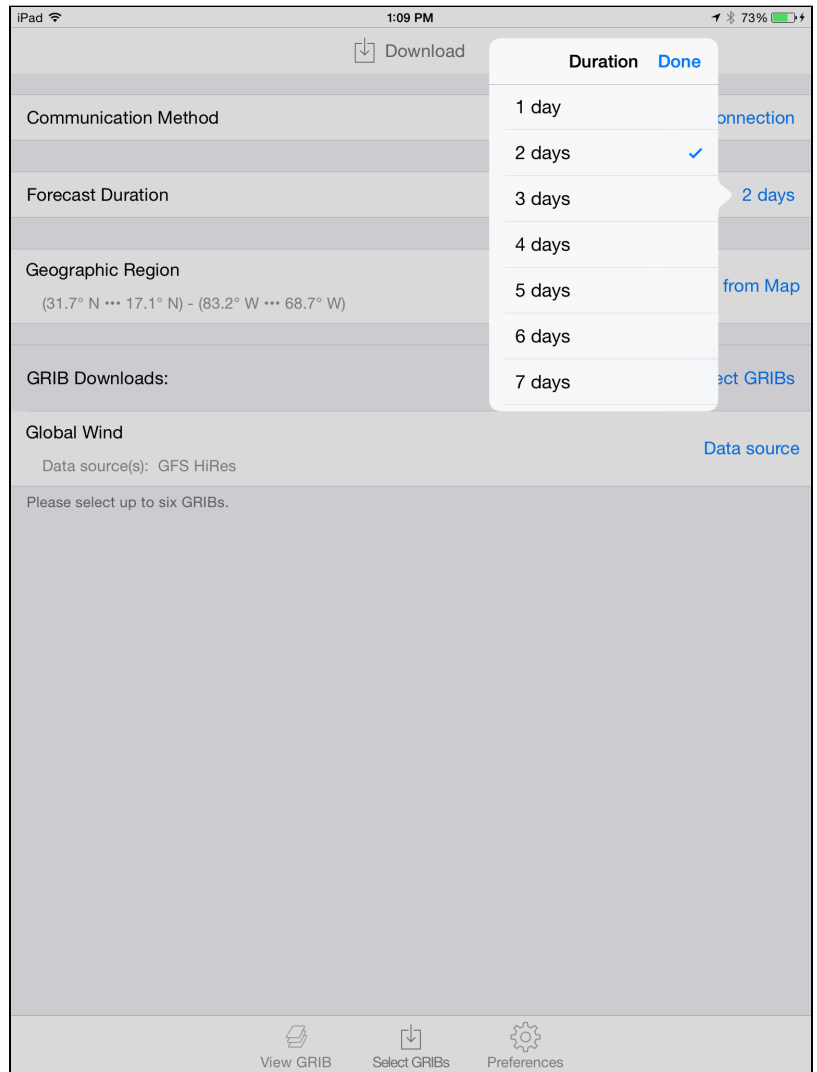
When finished here tap “Done” in the upper right corner.



## GRIB Explorer for iPad

### Forecast Duration

Selecting the Forecast Duration line will allow you to choose a forecast period of 1 to 7 days.



## Geographic Region

Selecting the Geographic Region line allows you to select the region you would like data for. You do this by placing your finger in the middle of the red box and dragging it over the area you desire. You can resize the box by dragging one of the corners in or out.

When finished select “Done” in the upper right.



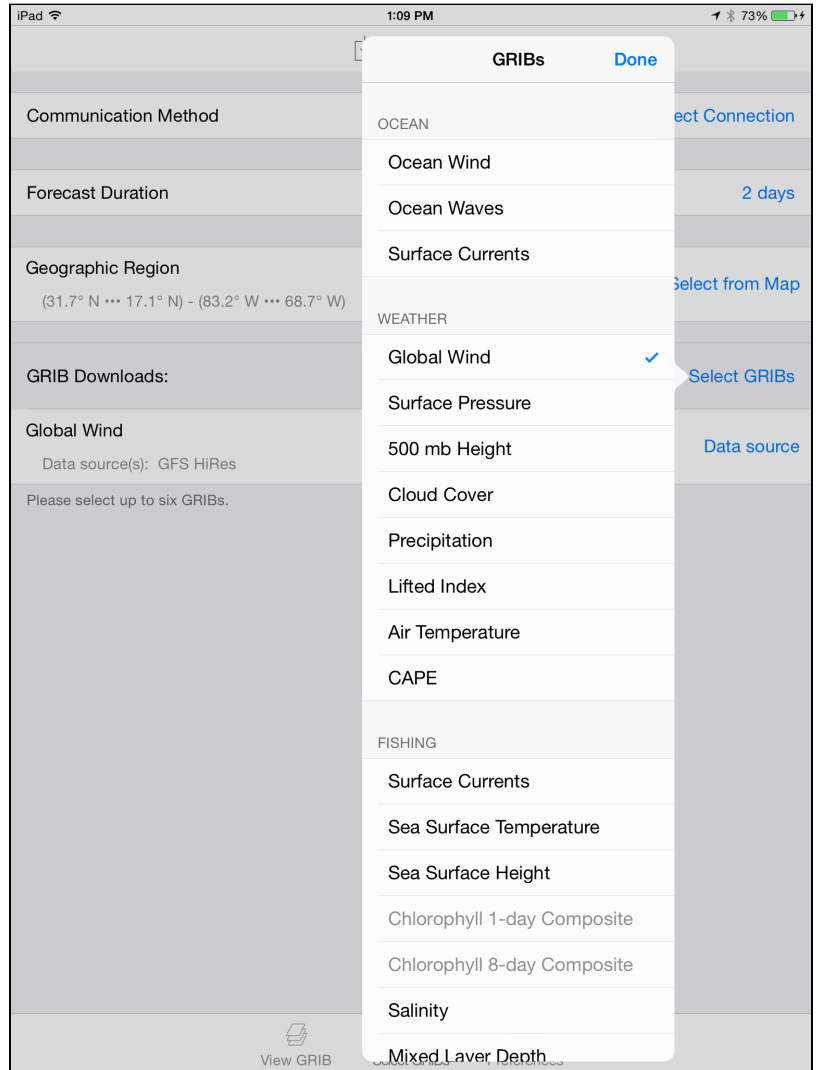
## GRIB Downloads

Selecting the GRIB Downloads line allows you to select the type of information you want to download. You can choose a maximum of six selections.

When finished select “Done” in the upper right.

You will now see your selections listed below. By selecting any one of the items you will also be able to choose the specific source for that data if multiple options are available.

**To download your files select *Download* at the top of the page.** The app will then connect to the servers and download your files. Once the individual files are downloaded the software will automatically create a combined file for viewing the data as one file with layers. It will then open that combined file.



## Preferences



The **Preferences** page has many of the advanced settings for how the GRIB data are displayed in the app.

### OCENS Weather Account

Review or correct your Username and Password.

### Home Location

Allows you to turn the following features on and off:

#### Use Device Location

Uses positioning data from your device to display your home location on the map

#### Plot home location on chart

#### Animate home location icon

Causes the home location icon to flash.

#### Display local date/time on all plots

Displays your local time on plot rather than GMT.

### Display

- General

Date and time stamp location

Set date and time stamp location on screen.

[Activate finger position coordinates](#)

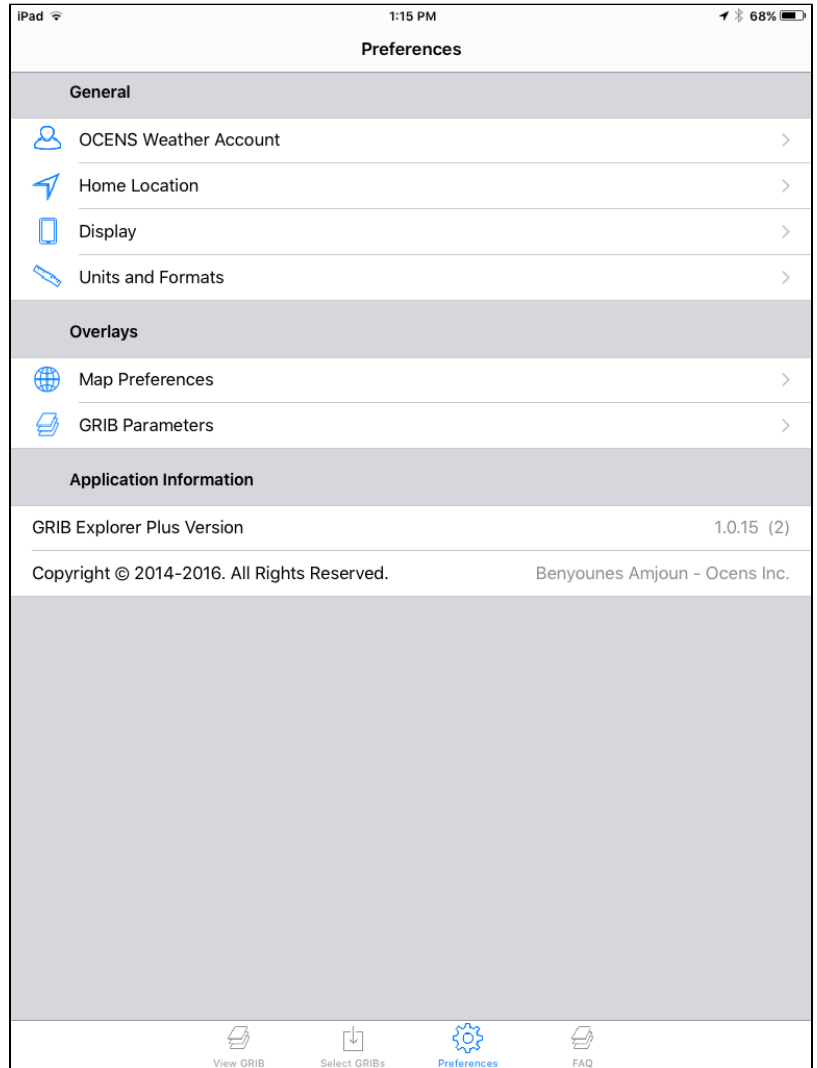
[Display finger coordinates](#)

- Animation Speed

This allows you to adjust the speed of the plot transitions.

### Units and Formats

- Measurements Units



This allows you to change how the distance and measurements are displayed

- **Formats**

Here you can change how position data, Angle (or heading) information, and time is displayed

## **Overlays**

- **Map Preferences**

This section allows you to change how the map features are displayed.

- **GRIB Parameters**

*General Options*

Display grid values

Turning this on will display the GRIB parameter at each data point.

*Current Document Parameters*

This lists the current parameters being displayed and allows you to change how they are represented on the screen.

*All Document Parameters*

This lists all of the supported parameters and allows you to change how they are represented on the screen.

## **All GRIB Parameters**

Here you can alter how any particular parameter is displayed on the screen. You can change things like: Plot Type – lines or color fills, measurement units, colors, and transparency.

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### Why can't I download a GRIB file?

There could be a few reasons but if you are just starting out, its possible that your demo period has ended and you are trying to access OCENS' Everon servers without an active account.

Other reasons that could explain why I am unable to download?

1. Check to be sure you are attached to the correct Wi-Fi device in your iPad's General Settings. This is often a problem when users are running through a satellite Wi-Fi connection; GE Plus is compatible with Iridium, Inmarsat and Globalstar satellite phones as well as your local Wi-Fi connection (home, office, etc).
2. Ensure that the device you have selected as your Communication Method on the Get GRIB page of GE Plus is the same device you have selected in (1) above;
3. If you do have an active Everon account, be sure you have entered your correct username and password in the GE Plus Preferences;
4. If using an Iridium GO!, check that username 'guest' and password 'guest' (each without the apostrophes) is entered as the Iridium GO! account username and password. You will see these on the screen after you change your Connection Method from Direct Connection to Iridium GO!
5. With any satellite device, verify that you have sufficient signal strength. If Iridium you should have a minimum of 4 to 5 signal bars on your phone in order to conduct a data transfer.
6. Check to see if iCloud Drive is ON and if it is turn it OFF. This is quite common. If iCloud is on, it will attempt to update once the connection is opened to your satellite device. It will fail to open but the process of its failure will interfere with access to the weather downloads. Go to your iPad Settings, find iCloud, and turn iCloud Drive from ON to OFF.
7. The firmware on your Iridium GO! Make sure this is current. Contact OCENS if you have a question about the latest GO! firmware version.

See [Communication Method](#)

### **How long does my demo period last?**

There is a 24 hour period after installation when you can access the OCENS Everon servers as a GE Plus demo user. The demo username and password is pre-configured during this time period. Just go to Get GRIBs, specify the duration, location and type of GRIB files you desire, then press Download.

### **What happens after my demo period expires?**

You can continue to use GE Plus with GRIB 1 GRIB files you acquire from other sources or as attachments to emails sent to you. You can do this without signing up for any other OCENS service; or You can sign up for the OCENS Everon weather and ocean data service which works together with GE Plus to deliver GRIB files to you from around the world through Wi-Fi and satellite connections.

**Will this work through my home internet?**

Yes. Of course, you must have home Wi-Fi and you must connect your iPad to the home Wi-Fi in your iPad's General Settings.

## **Can GE Plus open GRIB files that are emailed to me?**

Yes.

### **How do I open a GRIB that has been emailed to me?**

Find the email and its attachment, then press and hold on the attachment until the iPad advises what iPad software is available to possibly open the file. When this happens, slide over and select GE Plus. GE Plus will auto-open and navigate the GRIB. The GRIB must be a properly constructed GRIB 1 grib.

### **Do I need an account to use this app?**

To get the most out of GE Plus, a weather account with OCENS on our Everon server is recommended but it is NOT mandatory. Whether or not you have an account with OCENS, GRIB Explorer Plus (GE Plus) will display and process GRIB1 grib files that are emailed to you.

### **What are the benefits of an Everon account?**

Everon servers provide on-demand delivery of weather, ocean & fishing data from multiple GRIB models for any location on land or sea. Met data available from Everon includes wind, surface pressure, precipitation, cloud cover, 500 mb height, lifted index & CAPE. ASCAT scatterometry, RAP NAM & CONUS, NDFD vector & many more. Ocean data available from Everon includes wave, sea temperature, sea surface height, ocean currents, salinity & mixed layer depth. GE Plus users working with Everon box the area of the world for which they are interested in obtaining data, specify the forecast period & the specific models they want to use as their source of data. GE Plus Download auto- accesses the Everon server, then retrieves, unpacks, processes, maps & displays the GRIB data in seconds.

## Pricing

### How much does an OCENS Everon account cost?

There are three options:

- Postpaid: You pay an annual fee of \$49 to maintain an account and then a small content fee for each download.
- Prepaid Unlimited: You pay a fixed fee for a fixed period of time for an unlimited number of downloads.
  - a. There are two prepaid flavors:
    - i. Met: Unlimited access to 'met' data such as wind, pressure, precipitation, cloud cover, lifted index, air temperature, CAPE and others. We include wave data in the met category
    - ii. Met and Ocean: Unlimited access to all the met data in (a) plus ocean data such as sea temperature, ocean currents, sea surface height, salinity and mixed layer depth.

### What are the content fees associated with Postpaid plan downloads?

If you choose this plan your credit card will be billed monthly for your weather file downloads according to the following schedule; per file:

Met data includes wind, waves, surface pressure, 500 mb height, precipitation, cloud cover, lifted index, CAPE, and air temperature.

- Class 1: 1 day Met: 30 cents
- Class 2: 2 day Met: 35 cents
- Class 3: 3 day Met: 40 cents
- Class 4: 4 day Met: 45 cents
- Class 5: 5 day Met: 50 cents
- Class 6: 6 day Met: 60 cents
- Class 7: 7 day Met: 70 cents

Ocean data includes ocean currents, sea surface temperature, sea surface height, sea surface salinity, mixed layer depth and chlorophyll.

- Class 10: SST/SSH/SSS/SSC/MLD: \$5.00 to \$9.00 depending on # of days.

### What is your pricing for GE Plus Unlimited Met plans?

Unlimited GRIB Met plans include unlimited access to wind, wave, surface pressure, 500mb height, precipitation, cloud cover, lifted index, CAPE, and air temperature.

- 1 month \$45\*
- 3 month \$75\*
- 6 month \$120\*
- 12 months \$180\*

\*Downloads of Class 10 ocean products are NOT included in your Unlimited GRIB Met plan and will be charged separately at \$5 per piece downloaded.

### What is your pricing for GE Plus Unlimited Met and Ocean plans?

Unlimited GRIB Met and Ocean data plans include all Met data (see above) as well as ocean currents, sea surface temperature, sea surface height, sea surface salinity, mixed layer depth and chlorophyll.

- 1 month \$100
- 3 month \$225
- 6 month \$420
- 12 month \$750

**Can I download ocean data even if I have only signed up under an Unlimited Met plan?**

Yes. Ocean data are classified as Class 10 products. Class 10 products are priced at \$5 per product. You will be billed separately at \$5 per download when downloading a Class 10 ocean product within an Unlimited Met-only subscription.

### How does the Resume capability work?

When working through a satellite connection, you may at times experience a degradation of signal strength. If the signal drops sufficiently your data connection will be lost. When signal is restored, GE Plus' Resume capability will now recommence the file download from where it dropped rather than force you to download the entire file again. This can offer a substantial potential savings in airtime.

But just how does Resume work?

Most of us monitor our downloads pretty closely as they process. If signal drops to the point of losing the data connection, GE Plus will post a message such as 'Deactivating Connection', followed 10 to 20 seconds later with a message 'Unable to Connect to Server'. At this point, begin monitoring the signal strength meter on your device. Once you see it move to and stabilize at 4 to 5 bars of signal, return to GE Plus and press the Download button on the Get GRIBs page. GE Plus will reach out to your device and commence the dialing process. At some stage within this process, GE Plus will post a query to you of the form, Resume Previous Download, Yes or No. If Yes, upon its reconnection to the OCENS Everon servers, GE Plus will continue your previous download from the point where the connection broke. If No, GE Plus will start from byte 1 and download the entire file or file group again.



## Types of GRIBs

This section discusses some of the less well-known types of GRIB data which are available in GE Plus.

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## RAP and HRRR

The Rapid Refresh (RAP) model is available in three forms. The RAP HiRes (also called RAP CONUS) model is focused on the continental US. Nevertheless, it provides marine coverage out to about 130 degrees W on the US West Coast and about 60 degrees West along the US East Coast. Much of the Caribbean is also covered as is all of the Gulf of Mexico and Gulf of California. It offers about 8 data points for each degree of coverage.

The second RAP model is the RAP Fast (also call RAP NAM). This RAP Fast model covers all of North America, including Alaska, Hawaii, and Central America. A chunk of northern South America is also included in this model. This is a lower spatial resolution model than the RAP HiRes providing 3 data points per degree (compared to 8 data points per degree in the HiRes). For the satellite user, this is important because for the same area, a RAP Fast file will download faster than a RAP HiRes because it contains fewer data points.

Both RAP models offer 1 hour temporal resolution model forecasting over an 18 hour time period. Each was constructed to serve the needs of users needing frequently updated short-term forecasts. This means it is most commonly used by aviators and severe weather forecasters. However, these features will benefit any GE Plus user monitoring short-term weather conditions changing at a pace that is faster than the 3 or 6 hour model update frequencies typical of most weather models.

The third RAP variant is the Very High Resolution Rapid Refresh (HRRR) model. This is awesome data with a spatial resolution of about 3 km or more than 30 data points per degree. Data is of such a high resolution that it can be used in inland waters such as Chesapeake Bay, Long Island Sound, Puget Sound, San Francisco Bay and others. In Puget Sound, for example, the HRRR model returns 3 to 4 wind barbs where other models display 1 at most. Of course, the trade off for this high spatial resolution is BIG file size. So when using HRRR data, be sure your GRIB boxes are 1 or 2 degrees at most if connecting through a satellite phone. Expand if on cellular or network connections.

RAP wind, precipitation, CAPE, lifted index, air temperature, 500 mb and cloud cover GRIBs are available in all models. Pressure data is also available in the HRRR data set. You must choose a Forecast Duration of 03 through 18 hours in order to have access to ANY of the RAP data in the Global Wind category. If you select 03 through 18 for a Forecast Duration AND you want to access the HRRR data, you will be asked to select one or more time periods when you actually pick HRRR from the Global Wind drop down.

Selection of RAP Fast, RAP HiRes or HRRR is an either/or proposition. You cannot select more than one model source at a time.

## Lightning

As you can imagine, lightning data are phenomenal ways to track storm movement. Lightning data are available in GE Plus for the Northern Hemisphere from 160E to the Prime Meridian (0). Lightning data is collected every 15 minutes by remote sensors, processed and pulled to the OCENS Everon servers in GRIB form. The most recent 4 frames of data are included in each of your downloads of Lightning data. In general, the age of the most recent of these frames ranges from 15 to 30 minutes depending on the timing of your data request. Access to the most recent 4 frames allows you to gain a quick sense of the movement of the storms around you by clicking on the GE Plus Animate button. These four frames will process in a looping movie.

Lightning data is displayed in strike densities which are expressed as the number of lightning strikes per square kilometer per minute x 1000. As that's a rather obtuse variable its a good thing that specific strike densities are less important than their relative densities. For one thing you want to know where the storms are located and a quick scan of the GRIB frames immediately answers this question for you. Secondly, now that you've spotted the storm, how intense is it? Answer this by either looking at the color assigned to the cell or cell components by GRIB Explorer or by passing your cursor over the storm cells. The higher the number of strikes the more intense the storm. mapping. Storm cell centers frankly pop out at you when using this tool Lightning data will be 'available' for download for any forecast duration from 1 day to 7 days. However, you will only ever retrieve data for the most recent 60 minutes. We just felt it is friendlier to allow you to pull lightning data no matter how many days of other forecast data you are retrieving.

## NDFD

For decades some of the finest weather forecasts in the world were captured in the weather charts produced by the NOAA Ocean Prediction Center. Forecasters pored over the very best available model, buoy, ship of opportunity and satellite data, combined this with their years of forecasting experience and local knowledge and produced weather charts every ocean mariner learned to rely upon. Until the 1990's, these charts were only available via weatherfax broadcast and mariners went through reams of chart paper and hours of time tuning their weather fax radios to receive the data. With the growth of the Internet in the late 1990s, chart distribution expanded to this medium and OCENS WeatherStation was the first such service to make them available to satellite phone users.

For years, NOAA has been working on the next step in this evolution. To move the static OPC and NHC weather charts and their classic picture file formats into GRIB data so these data become all that more relevant to the at-sea user now dependent on satellite phones, electronic charting and so many other components of the electronic ship. The first realization of these efforts is that which is now available in the NDFD data just released in GE Plus. NDFD data preserve all the human intelligence and local knowledge put into the OPC and NHC charts but make this information available in the form of GRIBs which can be animated, layered and closely analyzed.

Presently, only wind and significant wave height data is available in the NDFD form. Furthermore, the geographic coverage of the NDFD GRIB data is, to say the least, disjointed. A map of that coverage is presented below. NOAA is working to expand both the coverage and the type of data available as NDFD GRIBs in the next few years.

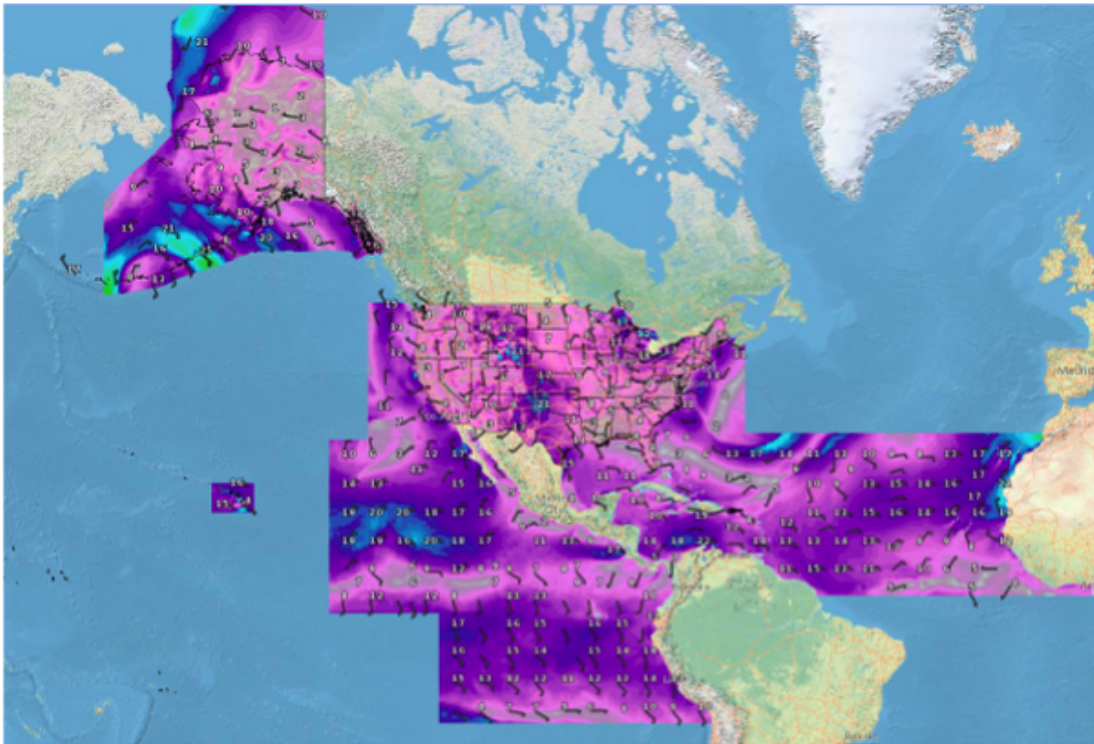


Figure 1. Coverage of the NDFD wind and SWH data. Wind arrows in this global view do not reflect what we obtain by download, which is one arrow every 0.12°.

NDFD data in GE Plus is available at two resolutions. NDFD Fast data is at 0.25 degree (4 data points per degree) while NDFD HiRes is 0.125 degree data or 8 data points per degree. As an example of the difference this makes on download times, a 10x10 NDFD HiRes wind GRIB will take just under 4 Iridium minutes to download. The same 10x10 area in NDFD Fast data consumes about 1.5 minutes of Iridium airtime.

NDFD data are available for forecast durations of 1 through 6 days inside of the Ocean Wind and Ocean Wave sections of GE Plus.



## Great Lakes

The newly added Great Lakes wind and wave data is available in two flavors. The very high resolution data is available at a scale of 1/16 of a degree or approximately one data point every 3.75 miles. The coarser resolution, roughly 8 mile scale data, is labeled FAST in GE Plus because its downloads occur much more quickly than the fine resolution product. FAST file sizes are roughly just 10% of the size of the high resolution product.

Great Lakes GRIBs are available for forecast durations of 1 through 7 days inside of the Ocean Wind and Ocean Wave sections of GE Plus.

## ASCAT Satellite Wind Scatterometry

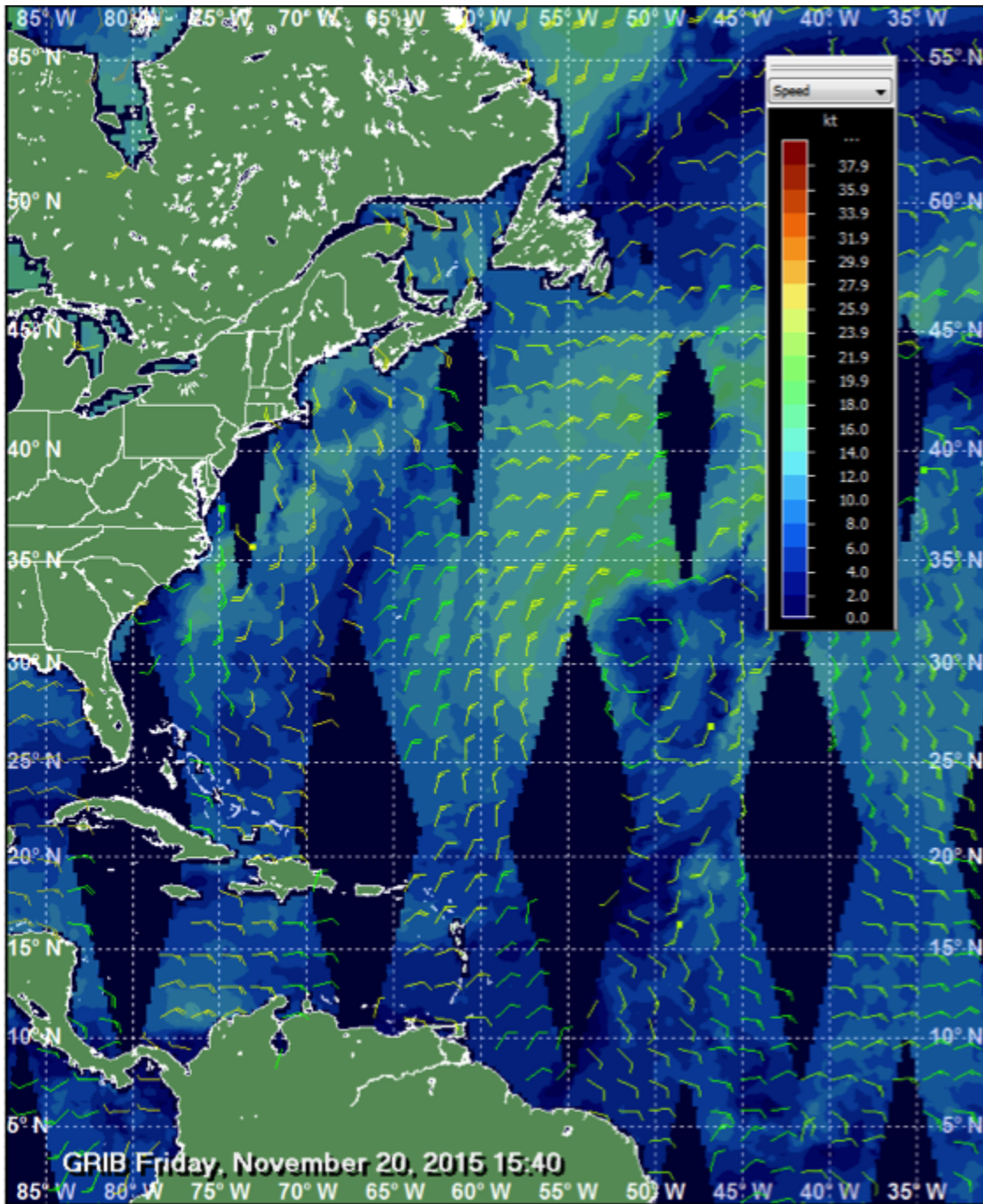
So Scatterometry. What the heck is scatterometry? These are ocean winds measured by a satellite, downloaded to a groundstation, processed into GRIB data and posted to OCENS Everon servers. As you can imagine, these are exceptionally unique data sets. Unlike any other GRIB wind products, scatterometer winds are NOT modeled winds. These are the actual winds on the surface of the ocean when the satellite passed overhead. It is as if you have an ocean buoy moored everywhere providing wind data feeds to you.

ASCAT's predecessor in the early 2000's was QuikScat. As GRIB Explorer was one of the few means of viewing QuikScat data we received a fair amount of anecdotal comment on the information. One of these came from the Vende Globe racers. They found the QuikScat data so reliable that they actually used it to assess when they should set their spinnakers during the race.

Because they are measured, not modeled, winds, ASCAT data are not only an excellent source of wind data in and of themselves, they also offer a tremendous window into the accuracy of modeled GRIB wind data. Download an ASCAT file for the North Atlantic like and compare it to the WW3, NAVGEM or other model winds for the same area. Are the models overestimating, underestimating? Are projected wind shifts in the model actually occurring?

Here's a look at ASCAT data for the 20th of November over the Atlantic:





As you can see from the above picture and even more clearly if you download an ASCAT GRIB to GEPlus (download big chunks of the ocean...it's the one file where an ocean- wide download is often more informative than a 10x10 block), ASCAT data are unconventional, perhaps peculiar. The satellites scan and collect information in swaths. There are some noteworthy features of these swaths. First you'll see that each swath has a different time. This happens as the earth turns under the satellite as the satellite moves from pole to pole. Each orbit of the satellite is slightly offset from the one before it and through time the satellite tracks itself across the globe. Gaps in between swaths occur for two reasons: nothing is scanned directly under the satellite and the field-of- view of the satellite is not big enough to see overlap from one orbit to the next at low to mid-latitudes. Because the satellite converges on the poles, coverage at latitudes above about 50 is nearly complete.



Secondly, time changes within each swath. Move your cursor up and down through a swath. If time is increasing as you move from the top to the bottom of the screen, you are in a descending pass. If time is increasing from the bottom to the top, it's an ascending pass.

These passes are kind of tilted from the SE to the NW. Does that have any analytical importance? Not really. But time does have great analytical importance. Always be aware of the time of the ASCAT swath or the piece of the ASCAT swath at which you are looking. It takes about three hours for the satellite to collect the data, relay it to the groundstation, process the data and release it to the public. So the very best ASCAT data you can look at is about three hours old. If the area of the ocean you are interested in is not the subject of that orbit, then it will be older still. When comparing the wind speeds in the ASCAT data to the wind speeds in say your GFS model, be sure you are comparing the data to the correct time step of the GFS model.

So to what does the time stamp in the corner refer? This is the time when the file containing the data you are looking at was created. You will never find data in the picture that is newer than the time stamped here. Remember, if you have asked GRIB Explorer Plus to display your data in local time, the time here is offset from Greenwich or Universal Time by the number of hours of your offset.

GE Plus displays for you the 30 of the most recent orbits of ASCAT data. Furthermore, GE Plus always displays the most recent data 'on top'. That's why you see in some of these areas descending passes layering over the top of ascending ones and vica versa. So what looks like a hodgepodge of swaths going this way and that is actually following some pretty clear rules: 1) Always the 30 most recent orbits 2) IF there is data from those 30 orbits, its going to be plotted; 3) The most current data is always plotted on top and 4) Time differences exist in the data from orbit to orbit and north to south within the orbit.

What else is noteworthy? Look at the colors present in the swaths. Now find the color palette for your file (its in the upper right in the above picture). Colors in the ASCAT files refer to wind speeds with blues referring to the lower speeds and reds and oranges to the higher speeds.

One last thing. Rain confuses the ASCAT sensors. Confusion is bad because it makes the sensor think the wind is one speed when its actually another. So what the ASCAT data processors do is flag a wind measurement when they think it might be contaminated by rainfall. As you move your cursor across the image you have downloaded, you'll see that the majority of the data is Rain of No, ie Not contaminated by Rain. So its not a huge issue but something to keep an eye on this as you begin to use the data.

And don't forget to use the Route Finder tool to identify key wind values.

## Thermocline

### Sub-Surface Temperatures and FishMap with Thermocline

GRIB Explorer Plus provides global access to sub-surface temperature data down to 1000 meters. These are individual files you can download. It also offers a **Thermocline** product which combines all those layers into one file so you get a complete picture of subsurface conditions around you.

The Thermocline tool shows you the depth of the mixed layer in the ocean. And because we combine the tool with the preferred temperature ranges of 40 different fish species, it also shows you the depth in the ocean around you at which those preferred temperatures are located.

To top it off, we then create a Fishing Map showing you how the amount water at those preferred temperatures changes across the fishing area of interest to you. In short the FishMap identifies areas where opportunities to find your target species should be highest.

These data are found under the Fishing section of the Select GRIBs menu on the Select GRIBs page. Sub-surface temperatures are available at 12 levels from 10 m to 1000 m below the surface. All layers are forecast out 1 day into the future (regardless of the forecast duration you have specified elsewhere on the Select GRIBs page). Select the layer or layers of interest to you by tagging each with a light tap. Once your layers are selected for the region of interest to you press Download at the top of the Get GRIBs page. Data will be retrieved and presented on the View GRIB page. Things get even more interesting if you select the **FishMap with Thermocline** product on the Select GRIBs page! In this product, we merge all 12 sub-surface layers into a single file. You cannot download the FishMap with Thermocline product and one or more sub- surface temperature layers. Its one product type or the other. Since the FishMap with Thermocline contains ALL of the sub-surface layers it would be pointless to download both it and individuals sub-SST layers.

## Requesting GRIBs

### How do I request GRIBs after signing up for the OCENS service

- Go to Get GRIBs
- Select the Connection Method you want to use (be sure this connection method is the same method that is selected in your iPads Wifi Settings in its General Settings)
- In Forecast Duration, select the number of hours or days of data in which you are interested
- In Geographic Region, draw a box around the area of the world for which you want to receive data
- In GRIB Downloads, select the Type of grib data you want, then;
  - a. For each type you select, choose the model or models you want to use for that type by tapping on each.
- Press the Download button at the top of the screen.

### Can I choose a rectangular geographic region instead of a square region?

No. All regions are square boxes. Once downloaded, you can zoom within any portion of the downloaded file(s).

### How come some downloads take a long time over a satellite connection?

Because most handheld satellite phones are SLOW. Remember, Iridium phones and the GO! operate at a speed of 2400 baud. That speed only downloads 18000 bytes in one minute. IsatPhones are even slower. Globalstar phones are a little faster but still nothing like your home internet speeds.

### How can I speed up the downloads?

Choose fewer days, a smaller box (generally a 10x10 or 15x15 degree box is plenty big) and/or fewer GRIB files. Also, GE Plus often offers a high and a low resolution GRIB option (the low resolution file is nicknamed FAST). Choose the FAST version of those models when they are available and you are connecting through a satellite phone.

### How can I best use the file size estimates GE Plus provides to me on the Select GRIB page?

As you add files to your download, change the number of days in your forecast period or adjust the map size, GE Plus will show you an approximate file size in kilobytes. This file size estimate is posted at the top of the GRIB Downloads section on the Select GRIBs page.

Of course, by itself the file size meter can give you immediate feedback on the relative size of your days, map and file selection decisions (bigger numbers of kb will take longer to download than smaller numbers). Taken a step further, however, the file size value can give you a pretty good assessment of just how long it will take you to process a download through your satellite device if you also know the rough speed which your satellite service can process data. What follows are some guidelines on service speed:

Iridium handhelds and GO!: 18 kb per minute

Iridium OpenPort: 960 kb per minute

Inmarsat IsatPhone: 9 kb per minute

Inmarsat Fleet Broadband 150: 1,125 kb per minute

Inmarsat Fleet Broadband 250: 2,250 kb per minute

Globalstar handhelds and SatFi: 72 kb per minute

VSAT V3: 960 kb per minute

See [Select GRIBs](#)

## Analyzing your data

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### **What is the Route Finder tool?**

The Route Finder tool is a graphing assistant found under the Graph icon at the top of the View GRIBs screen in GE Plus. When selected, a red line immediately bisects your GRIB display (with one end labeled A and the other B) and a graph insert appears. The X axis of the graph relates to the distance between A and B. The Y axis shows you the intensity of the variable you are studying (eg. knots of wind or mb of pressure). If you have a multi-variable grib product such as wind, above the graph is shown data like wind direction. Below the graph is displayed the latitude and longitude points associated with points A and B.

### **Why would I use the Route Finder tool?**

Tap and hold on either end of the red line to move that end to a starting or ending spot of interest to you. Watch the graph change as you move the end point. The Route Finder tool is a good way to quickly look at the forecast weather along different routes you can take to your destination.

### **What is the Time Profile tool?**

It's another analytical assistant found under the Graph icon on the View GRIBs screen. Tap on the Time Profile tool and a graph appears with the X axis referring to the weather variable level (eg wind speed in knots or pressure in mb) and the Y axis referring to time. Off to the right are secondary variables associated with this product. Clicking the 2X icon in the upper right corner of the graph, doubles the size of the graph. 1X reduces it to normal size. X closes the graph.

### **Why would I use the Time Profile tool?**

Find the Cursor Position pointer (it's a transparent box with a finger pointing to it). Put your finger on the graphical finger and move it around the screen. Watch the contents of the Time Profile tool. The Time Profiler is letting you look through time at any single position on the graph without paging through each frame of the grib. It offers a quick means of assessing whether now is the time to leave or if it's better to wait or how conditions might be changing at several points along a planned route.

## What is the Thermocline tool and how to I use it?

### Sub-Surface Temperatures and FishMap with Thermocline

The Thermocline tool is found under the Graphs icon on the View GRIB page. It only works in conjunction with the FishMap with Thermocline product. Once you have launched the tool, you see a grid with depths along the vertical axis dropping from the surface to the deepest layer of the Thermocline grib you just downloaded. Depths are presented in meters or feet depending on your preference (you can change units by going to Preferences Units and Formats in the app). Below the grid are temperature values. These are the full range of temperatures present across ALL the temperature layers in your grib.

Now grab the finger pointer and begin to move it around the grib file in the background. Do you see the red line which appears immediately inside the grid? This is the Thermocline. Looking at it closer you see it's the change in temperature (look at the temperature scale below the graph) as a function of depth (#'s along the side).

Usually the Thermocline will drop straight or nearly straight down for 10s if not 100s of meters. It is saying that temperature is more or less steady through this range of depths. Then it will break sharply to your left and in doing so identify a layer in the sub-surface where temperature drops fast. The area above this shelf is called the Mixed Layer as water in this region easily mixes because of its similar physical properties. But the sharp break in temperature creates something of a wall between these warmer, mixed layers above and colder stratified layers below. It's a hugely important control zone for thermometric species like tuna and billfish. These species can then move between the zone below it preferred by their physical processes and the zone above it preferred by their prey. Knowing where the mixed layer lies and how the preferred temperatures of these species relate to that zone can provide another factor contributing to fishing success.

GE Plus provides additional incredible insight into that analysis. Look above the red Thermocline and to the upper left corner of the Thermocline box (above the word Water Temperature). You should see the name of a fish specie there. Tap on it to see a list of 40 fish species presented there. Select the Fish Species you are targeting, lets use Bigeye Tuna in this example. Once we select Bigeye, a subtle shaded column appears in the grid with the red Thermocline line. Let's call this vertical column the Optimum Temperature (FishOT). You will notice that the location of this column will move right or left in the graph depending on what species you have selected. It is showing you the temperature range favored by the species you have selected.

If we move our cursor back into the grib, if there are temperatures in the grib favored by your target you will all of a sudden see a green, horizontal bar extending from the

vertical depth axis on the far left to the right until it reaches the Thermocline curve. We'll call this bar the Optimum Temperature at Depth or OTD bar. The upper edge of the OTD bar is equal to the maximum temperature for your target species and it is positioned to show you the depth at which this temperature occurs in the ocean underneath your cursor. Similarly, the lower edge of the OTD bar represents the minimum temperature for your target species and the depth at which that minimum temperature is located. In short, this horizontal bar shows you the depths at which the optimum temperatures for your target species exist in the ocean at the position of your cursor.

Disagree with the Optimum Temperature range we've started with for your target species? No problem. Simply click on the icon which looks like a pen at the top of the grid, change the upper and lower temperatures to values you prefer by sliding the temperature bubbles to the right or left and click Save. New temperatures are saved on a species-by-species basis. Should you want to switch back to the original values, click on Restores Defaults at the base of the Edit screen and the original temperatures for that species will be reloaded.

Or maybe you are targeting a species not listed on the pull-down? Scroll to the bottom of the list of included species to find Other Species 1, 2 or 3. Select one of these and customize the temperature ranges to your liking for that species.

On the Edit screen you can also set the Fishing Depth for your vessel or gear. Even though the thermocline graph may show a lot of water at the preferred temperatures for your target at this location, what if the temperatures are too deep for you to use? The white line you see cutting across the graph is the Maximum Fishing Depth for your boat or gear. Adjust the depth of this line by clicking on the Edit pen and sliding the Fishing Depth pen left or right.

Let's move your cursor around the grib until you once again see the green bar extend outward from the left axis to the red Thermocline line. The portion of this bar which lies ABOVE your Maximum Fishing Depth represents the Fishing Volume (temperature x depth) for your target species at this location. In general, the bigger this area above the Max Fishing Depth the more opportunity to find your target at this location. That is a really important point. For example, if all the preferred temperatures (and thus the green Fishing Volume bar) for the species you are targeting are deeper than you can fish, then your fishing volume is zero.

Move your cursor around the downloaded Thermocline file and observe how the Thermocline, the OTD bar and the Fishable Volume triangle change with location. Again, bigger bars mean there is more water at this location which is at temperatures that match your target species Optimum Temperature. Smaller bars mean there is less such water. Other factors being equal, opportunities for successful fishing outcomes should increase as the size of the Fishable Volume bar increases.

We could stop right there and have an amazing fish finding tool. But we don't!

By moving my cursor around I can inspect my fishing area and assess accessible Fishing Volume piece by piece. But what if you then had a means of assessing how Fishing Volume and thus fishing opportunity changes across the whole field of the grib you downloaded? In one picture! A means of integrating not only across the ocean but also looking vertically 'into' the ocean? That summarized this in one color-coded picture highlighting how the fishing volume for your target and your boat/gear changes in the whole ocean around you?

We've done that... This is the Fish Map.

Click on the icon above your Thermocline graph that looks like a fish. Three things happen:

- 1) Your background water temperature grib is replaced by a new rendering, the FishMap,
- 2) The temperature palette is replaced by a Fishing Volume palette and
- 3) An OTD meter appears in your cursor tracking graphic.

Let's explain each of them.

- 1) The background rendering now depicts the same area of the ocean that you have been looking at with your background GRIB and the Thermocline chart. Except that now we are no longer looking at the temperatures themselves but instead the amount of water containing target temperatures positioned above your maximum fishing depth. Again, and this is important, even though they are color-coded, these are NOT temperatures. The colors are Fishing Volumes. In one step, GE has swept through your background GRIB at ALL depth levels, calculated the Fishing Volume bar we described above and adjusted it for your Maximum Fishing Depth, at each of those points. It then color coded the volumes it came up with and plotted them as the FishMap;
- 2) The fishing volumes in the FishMap are shaded from cold blue to hot red. Find the Fishing Volume palette and notice how as the colors move towards red, the Fishing Volumes increase. In short, your eye is quickly drawn to



the bright yellows and reds in the Fishing Map because those areas of the ocean contain more water at your target temps and depths than do the areas shaded green and blue.

3) The OTD meter in your cursor tracking graphic provides another quick means of assessing fishability. Notice that the horizontal OTD meter says Surface at its one end and Fishing Depth (the depth you have set for your gear) at the right end of the meter. As you move your cursor around the FishMap, the amount and position of the green in the OTD meter changes. If your target species temperatures extend from the surface all the way to the fishing depth, then the OTD meter will be all green. If the temperatures start at the surface and go down to a certain depth before then the green will start from the left and extend to the right. Or target temperatures may be at depth and extend upwards but not quite to the surface. Then the green bar moves from the right to the left. With this meter we are trying to provide 3-D insights from a 2-D rendering.

### **Can you explain to me what's happening inside the Trip Planner tool?**

There's a lot going on here as Trip Planner is combining the information in Route Finder with that in the Time Profile. It plots position on the X axis and time on the Y axis and everything is related to the A-B line drawn on your map (which, of course, you can move around by tapping on either end of the line, holding and sliding). For a given A-B line, its telling you what is happening to the weather through time as you move farther and farther from point A.

### **How would I use the Trip Planner?**

You know how fast you are likely to sail, motor, or hike. Use this knowledge to estimate how far along the X axis you will be at each of the times posted on the Y axis. Use this estimate to see the weather that is forecast for that location for that time. By moving the line around, in effect you can search for a route that offers the best weather conditions for you and your operations.

## How do I change the variable that appears in the graph?

What if I've downloaded several weather variables... How do I change the variable that appears in the graph?

Find the color palette on the GE Plus screen. Tap on the weather variable name that appears at the top of that palette. A pop-up appears that let's you select the variable of interest to you that you want to appear in Route Finder, Time Profiler or Trip Planner. You can do this before or after you launch each one of these tools.

### **What animation tools are available?**

The animation icons appear in the upper right corner of the GE Plus screen. You can click the Play button to start a looping animation, click frame by frame forward or frame by frame backward, or click to go to the very end or the very beginning of the set of frames you have downloaded.

### How do I zoom?

Use your thumb and forefinger to pinch the display to zoom in or spread the display to zoom out.

### **How do I view only 1 GRIB from a multi-GRIB layered download?**

GE+ automatically layers all the data you requested into one picture. So if you download wind and waves and pressure, you'll see one chart on the View GRIB screen displaying each of those variables for each data point. You can, however, turn off the display of one or more of these variables. Simply find the Plotting GRIBs icon at the top of the screen (it looks like three rows of dots and dashes) and uncheck the variable type(s) you do not want to view.

## **How do I post the numeric values of each data point on the View GRIB screen?**

Go to Preferences. Select GRIB Parameters, then enable Display Grid values.

### How do I Delete GRIBs?

On the View Grib screen, find the Archive folder in the upper left corner of the screen. This shows all files recently downloaded. Swipe left on the file you want to delete.



GRIB Explorer for iPad

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