## GLOBE OGC Web Map Service Documentation

Summary

GLOBE provides the ability to view and interact with data measured across the world. Select the[visualization tool](http://vis.globe.gov/GLOBE/) to map, graph, filter and export data that have been measured across GLOBE protocols since 1995. Currently the GLOBE Data Visualization Tool supports a subset of protocols. Additional Features and capabilities are continually being added.

OGC Web Map Service (WMS)

The [Open Geospatial Consortium (OGC) Web Map Service (WMS)](http://www.opengeospatial.org/standards/wms/) provides a way for clients to receive a customized WMS response based on request parameters such as a custom bounding box, dimensions, layer(s) and format.  Unlike the rigidity enforced through tiled interfaces (e.g. WMTS and TWMS), WMS responses are more flexible and may contain multiple composited layers in a single output.  Two WMS specifications are currently available and supported by GLOBE: 1.1.1 and 1.3.0.  Both WMS specifications support a single method of image retrieval, which is supported by GLOBE.

**Service Endpoints and GetCapabilities**

The WMS specification requires that a WMS server provide information regarding the available imagery via a *GetCapabilities*request.  Here is a list of available service endpoints, projections, and their GetCapabilities request:

WMS endpoint: https://vis.globe.gov/geoserver/cite/wms

WMS v1.1.1 GetCapabilities:   [https://vis.globe.gov/geoserver/cite/wms ?SERVICE=WMS&REQUEST=GetCapabilities](%20https://vis.globe.gov/geoserver/cite/wms%20?SERVICE=WMS&REQUEST=GetCapabilities&VERSION=1.1.1)

WMS v1.3.0 GetCapabilities:  https://vis.globe.gov/geoserver/cite/wms ?SERVICE=WMS&REQUEST=GetCapabilities&VERSION=1.3.0

The response to a **GetCapabilities** request includes the following information:

* Image formats supported on a published target path basis for the maps. Note that the target path database information is sent in the connection URL.
* A list of layers supported by the published target path database. Each layer provides the following information:
  + Name of the layer
  + Spatial projection supported
  + Bounding box limitations based on the projection type
* Formats supported for any exceptions, such as invalid requests (requests not as per the international standards), service not supported etc.

An example **GetCapabilities** request output is as follows:

<WMT\_MS\_Capabilities updateSequence="0" version="1.1.1">  
  <Service>  
    <Name>OGC:WMS</Name>  
    <Title>GeoServer Web Map Service</Title>  
    <WMS\_Capabilities xmlns="http://www.opengis.net/wms" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.3.0" updateSequence="2009"xsi:schemaLocation="http://www.opengis.net/wms https://vis.globe.gov:443/geoserver/schemas/wms/1.3.0/capabilities\_1\_3\_0.xsd">

  </Service>  
  <Capability>  
    <Request>  
      <GetCapabilities>  
        <Format>text/xml</Format>  
        <DCPType>  
          <HTTP>  
            <Get>  
              <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink"  
              xlink:type="simple" xlink:href="http://108.59.84.128/Earth/wms"/>  
            </Get>  
          </HTTP>  
        </DCPType>  
      </GetCapabilities>  
      <GetMap>  
        <Format>image/png</Format>  
        <Format>image/jpeg</Format>  
        <DCPType>  
          <HTTP>  
            <Get>  
              <OnlineResource xlink:type="simple" xlink:href="http://boundlessgeo.com/solutions/solutions-software/geoserver/"/>  
            </Get>  
          </HTTP>  
        </DCPType>  
      </GetMap>  
    </Request>  
<Exception>

<Format>XML</Format>

<Format>INIMAGE</Format>

<Format>BLANK</Format>

<Format>JSON</Format>

</Exception>  
<Layer queryable="1" opaque="0">

<Name>dv\_aerosols</Name>

<Title>dv\_aerosols</Title>

<Abstract/>

<KeywordList>

<Keyword>features</Keyword>

<Keyword>dv\_aerosols</Keyword>

</KeywordList>

<CRS>EPSG:4326</CRS>

<CRS>CRS:84</CRS>

<EX\_GeographicBoundingBox>

<westBoundLongitude>-180.0</westBoundLongitude>

<eastBoundLongitude>180.0</eastBoundLongitude>

<southBoundLatitude>-90.0</southBoundLatitude>

<northBoundLatitude>90.0</northBoundLatitude>

</EX\_GeographicBoundingBox>

<BoundingBox CRS="CRS:84" minx="-180.0" miny="-90.0" maxx="180.0" maxy="90.0"/>

<BoundingBox CRS="EPSG:4326" minx="-90.0" miny="-180.0" maxx="90.0" maxy="180.0"/>

<Style>

<Name>dv\_aerosols\_aerosol\_optical\_thickness</Name>

<Title>dv\_aerosols\_aerosol\_optical\_thickness</Title>

<Abstract>

A style for showing dv\_aerosols\_aerosol\_optical\_thickness

</Abstract>

<LegendURL width="242" height="240">

<Format>image/png</Format>

<OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple" xlink:href="https://visdev.globe.gov:443/geoserver/cite/ows?service=WMS&request=GetLegendGraphic&format=image%2Fpng&width=20&height=20&layer=dv\_aerosols"/>

</LegendURL>

</Style>

</Layer>

    </Layer>  
  </Capability>  
</WMT\_MS\_Capabilities>

Once you have retrieved services and data information from GLOBE geoserver using **GetCapabilities**, you can then get the map image that you want using **GetMap**.

## GetMap

The **GetMap** operation requests the map from Google Earth Enterprise Server 5.x, based on the layer data that was discovered in the **GetCapabilities** step.

The URL the GIS client should use to make the **GetMap** request is as follows:

http://<hostname>/<target\_path>/wms?SERVICE=WMS&REQUEST=

GetMap&BBOX=<bounding\_box\_limits\_of\_the\_requested\_map>&SRS=<projection\_type>&WIDTH=<width\_of\_requested\_map>&HEIGHT=<height\_of\_requested\_map>&LAYERS=<layer\_name>&STYLES=<style\_info>&FORMAT=<format\_of\_requested\_map>&DPI=96&TRANSPARENT=TRUE

**Required View Parameters**

The core concept within the GetCapabilities response is a map layer.  GLOBE map layers represent data from various protocol measurements that changes over time, most commonly providing a different map in different style each day.  Therefore, the layer definition within the GLOBE GetCapabilities response must present these parameters.

|  |  |  |
| --- | --- | --- |
| **GetMap** Parameters | | |
| **Parameter** | **Mandatory?** | **Description** |
| SERVICE | No | Service name. Default value is WMS. |
| REQUEST | Yes | Operation name. Value is **GetMap**. |
| VERSION | No | Service version is one of 1.1.1 or 1.3.0. If no version is submitted, the WMS request defaults to the highest serving version, in this case 1.3.0. |
| LAYERS | Yes | GLOBE measurements Layer name for the requested map/image. |
| date | Yes | GLOBE measurements date: the day of requested data, in mm-dd-yyyy format, starting from 1995 |
| BBOX | Yes | Bounding box for map extent. Value is minx, miny, maxx, maxy in units of the SRS or CRS, depending on the version. Use SRS for version 1.1.1; use CRS for version 1.3.0. |
| SRS or CRS | Yes | Spatial Reference System (SRS) of map output. Value is in form EPSG:nnn. Use SRS for version 1.1.1; use CRS as the parameter key for version 1.3.0. |
| WIDTH | Yes | Width of map output, in pixels. |
| HEIGHT | Yes | Height of map output, in pixels. |
| FORMAT | Yes | Format for the map output. PNG or JPEG are currently supported. |
| STYLE | No | GLOBE Measurements Styles in which layers are to be rendered. Value is a list of required style names or empty if default styling is required. |
| DPI | No | Dots per inch. Value is client-dependent. For example, the QGIS client defaults to 96dpi. |
| TRANSPARENT | No | Determines if the map should be transparent. Values are TRUE and FALSE; default is FALSE. This parameter only applies when requesting PNG images. |
| BGCOLOR | No | Specifies the color to be used as the background (non-data) pixels of the map. The parameter is a hexadecimal encoding of an RGB value where two hexadecimal characters are used for each of red, green, and blue color values. The values can range between 00 and FF (0 and 255, base 10) for each. The format is 0xRRGGBB; either upper or lower case characters are allowed for RR, GG, and BB values. The “0x” prefix must have a lower case “x”. The default value is 0xFFFFFF, corresponding to the color white, which is used if this parameter is not included in the request. When FORMAT is a picture format, a WMS should set the background pixels to the color specified by BGCOLOR. When FORMAT is a graphic element format (which does not have an explicit background), or a picture format, a WMS should avoid use of the BGCOLOR value for foreground elements because they would not be visible against a background picture of the same color. |

An example **GetMap** request is:

* For version 1.1.1:

<https://vis.globe.gov/geoserver/cite/wms?SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&LAYERS=cite%3Adv_air_temp_dailies&STYLES=dv_air_temp_dailies_current_temp&VIEWPARAMS=date%3A03-21-2018&CRS=EPSG%3A3857&WIDTH=1691&HEIGHT=1232&BBOX=-27541789.898269832%2C-7484714.612459155%2C5547493.89826983%2C16622912.612459155>

* For version 1.3.0:

[https://vis.globe.gov/geoserver/cite/wms?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&LAYERS=cite%3Adv\_air\_temp\_dailies&STYLES=dv\_air\_temp\_dailies\_current\_temp&VIEWPARAMS=date%3A03-21-2018&CRS=EPSG%3A3857&WIDTH=1691&HEIGHT=1232&BBOX=-27541789.898269832%2C-7484714.612459155%2C5547493.89826983%2C16622912.612459155](https://visdev.globe.gov/geoserver/cite/wms?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&LAYERS=cite%3Adv_air_temp_dailies&STYLES=dv_air_temp_dailies_current_temp&VIEWPARAMS=date%3A03-21-2018&CRS=EPSG%3A3857&WIDTH=1691&HEIGHT=1232&BBOX=-27541789.898269832%2C-7484714.612459155%2C5547493.89826983%2C16622912.612459155)

**Available Protocol List and Corresponding Styles**

**Protocol List**

|  |
| --- |
| cite:dv\_data\_availability  cite:dv\_aerosols |
| cite:dv\_air\_temp\_dailies |
| cite:dv\_air\_temp\_max |
| cite:dv\_air\_temp\_monthlies |
| cite:dv\_air\_temp\_noons |
| cite:dv\_air\_temps |
| cite:dv\_barometric\_pressure\_noons |
| cite:dv\_barometric\_pressures |
| cite:dv\_carbon\_cycle\_summary |
| cite:dv\_conductivities |
| cite:dv\_dissolved\_oxygens |
| cite:dv\_extremes |
| cite:dv\_freshwater\_macroinvertebrates |
| cite:dv\_frost\_tubes |
| cite:dv\_greenings\_down |
| cite:dv\_greenings\_up |
| cite:dv\_humidities |
| cite:dv\_humidity\_monthlies |
| cite:dv\_humidity\_noons |
| cite:dv\_hydrology\_alkalinities |
| cite:dv\_hydrology\_phs |
| cite:dv\_land\_covers |
| cite:dv\_lilacs |
| cite:dv\_mosquito\_habitat\_mapper |
| cite:dv\_mosquitoes |
| cite:dv\_nitrates |
| cite:dv\_ozone\_one\_hour\_after\_noons |
| cite:dv\_ozones |
| cite:dv\_phenological\_gardens |
| cite:dv\_precipitation\_monthlies |
| cite:dv\_precipitations |
| cite:dv\_salinities |
| cite:dv\_sky\_condition\_noons |
| cite:dv\_sky\_conditions |
| cite:dv\_snowpacks |
| cite:dv\_soil\_characterizations |
| cite:dv\_soil\_characterizations\_horizon |
| cite:dv\_soil\_characterizations\_reference |
| cite:dv\_soil\_densities |
| cite:dv\_soil\_descriptions |
| cite:dv\_soil\_fertilities |
| cite:dv\_soil\_layer\_descriptions |
| cite:dv\_soil\_moisture\_for\_smap |
| cite:dv\_soil\_moisture\_via\_gravimetrics |
| cite:dv\_soil\_moisture\_via\_sensors |
| cite:dv\_soil\_particle\_size\_distributions |
| cite:dv\_soil\_phs |
| cite:dv\_soil\_temp\_dailies |
| cite:dv\_soil\_temp\_monthlies |
| cite:dv\_soil\_temp\_noons |
| cite:dv\_soil\_temp\_sub\_days |
| cite:dv\_surface\_temperature\_noons |
| cite:dv\_surface\_temperatures |
| cite:dv\_transparencies |
| cite:dv\_tree\_heights |
| cite:dv\_volumetric\_soil\_moisture\_monthlies |
| cite:dv\_water\_temperatures |
| cite:dv\_water\_vapors |

**Corresponding Protocol Styles**

Each corresponding styles listed below is named after it’s corresponding protocol. For example, <dv\_aerosols\_aerosol\_optical\_thickness> style and all other styles starting with <dv\_aerosols>\_\* prefix, must be used for <cite:dv\_aerosols> protocol, while <\*\_counts> suffix styles are used with <cite:data\_availabilty> protocol.

dv\_aerosols\_aerosol\_optical\_thickness

dv\_aerosols\_aerosol\_optical\_thickness\_contour

dv\_aerosols\_aerosol\_optical\_thickness\_counts

dv\_aerosols\_transmission\_percent

dv\_aerosols\_transmission\_percent\_contour

dv\_aerosols\_transmission\_percent\_counts

dv\_air\_temp\_dailies

dv\_air\_temp\_dailies\_contour

dv\_air\_temp\_dailies\_counts

dv\_air\_temp\_dailies\_current\_temp

dv\_air\_temp\_dailies\_current\_temp\_contour

dv\_air\_temp\_dailies\_current\_temp\_counts

dv\_air\_temp\_dailies\_maximum\_temp

dv\_air\_temp\_dailies\_maximum\_temp\_contour

dv\_air\_temp\_dailies\_maximum\_temp\_counts

dv\_air\_temp\_dailies\_minimum\_temp

dv\_air\_temp\_dailies\_minimum\_temp\_contour

dv\_air\_temp\_dailies\_minimum\_temp\_counts

dv\_air\_temp\_monthlies\_average\_temp\_c

dv\_air\_temp\_monthlies\_average\_temp\_c\_contour

dv\_air\_temp\_monthlies\_average\_temp\_c\_counts

dv\_air\_temp\_monthlies\_maximum\_temp\_c

dv\_air\_temp\_monthlies\_maximum\_temp\_c\_contour

dv\_air\_temp\_monthlies\_maximum\_temp\_c\_counts

dv\_air\_temp\_monthlies\_minimum\_temp\_c

dv\_air\_temp\_monthlies\_minimum\_temp\_c\_contour

dv\_air\_temp\_monthlies\_minimum\_temp\_c\_counts

dv\_air\_temp\_noons\_current\_temp\_c

dv\_air\_temp\_noons\_current\_temp\_c\_contour

dv\_air\_temp\_noons\_current\_temp\_c\_counts

dv\_air\_temps\_current\_temp

dv\_air\_temps\_current\_temp\_contour

dv\_air\_temps\_current\_temp\_counts

dv\_barometric\_pressure\_noons

dv\_barometric\_pressure\_noons\_counts

dv\_barometric\_pressure\_noons\_pressure

dv\_barometric\_pressure\_noons\_pressure\_contour

dv\_barometric\_pressure\_noons\_pressure\_counts

dv\_barometric\_pressure\_noons\_sea\_level\_pressure

dv\_barometric\_pressure\_noons\_sea\_level\_pressure\_contour

dv\_barometric\_pressure\_noons\_sea\_level\_pressure\_counts

dv\_barometric\_pressures

dv\_barometric\_pressures\_counts

dv\_barometric\_pressures\_pressure

dv\_barometric\_pressures\_pressure\_contour

dv\_barometric\_pressures\_pressure\_counts

dv\_barometric\_pressures\_sea\_level\_pressure

dv\_barometric\_pressures\_sea\_level\_pressure\_contour

dv\_barometric\_pressures\_sea\_level\_pressure\_counts

dv\_carbon\_cycle\_summary\_total\_carbon\_storage\_g\_c\_per\_m\_sqr

dv\_carbon\_cycle\_summary\_total\_carbon\_storage\_g\_c\_per\_m\_sqr\_counts

dv\_carbon\_cycle\_summary\_tree\_diversity

dv\_carbon\_cycle\_summary\_tree\_diversity\_counts

dv\_conductivities

dv\_conductivities\_conductivity\_micro\_siemens\_per\_cm

dv\_conductivities\_conductivity\_micro\_siemens\_per\_cm\_contour

dv\_conductivities\_conductivity\_micro\_siemens\_per\_cm\_counts

dv\_dissolved\_oxygens

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_kit\_mgl

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_kit\_mgl\_contour

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_kit\_mgl\_counts

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_probe\_mgl

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_probe\_mgl\_contour

dv\_dissolved\_oxygens\_dissolved\_oxygen\_via\_probe\_mgl\_counts

dv\_dissolved\_oxygens\_salinity\_via\_dokit\_ppt

dv\_dissolved\_oxygens\_salinity\_via\_dokit\_ppt\_contour

dv\_dissolved\_oxygens\_salinity\_via\_dokit\_ppt\_counts

dv\_extremes

dv\_freshwater\_macroinvertebrates\_site\_id

dv\_freshwater\_macroinvertebrates\_site\_id\_counts

dv\_frost\_tubes\_depth\_of\_freezing\_cm

dv\_frost\_tubes\_depth\_of\_freezing\_cm\_counts

dv\_greenings\_down\_grass

dv\_greenings\_down\_grass\_counts

dv\_greenings\_down\_green\_down

dv\_greenings\_down\_green\_down\_counts

dv\_greenings\_down\_tree

dv\_greenings\_down\_tree\_counts

dv\_greenings\_up\_grass

dv\_greenings\_up\_grass\_counts

dv\_greenings\_up\_green\_up

dv\_greenings\_up\_green\_up\_counts

dv\_greenings\_up\_tree

dv\_greenings\_up\_tree\_counts

dv\_humidities

dv\_humidities\_counts

dv\_humidities\_dewpoint

dv\_humidities\_dewpoint\_contour

dv\_humidities\_dewpoint\_counts

dv\_humidities\_relative\_humidity\_percent

dv\_humidities\_relative\_humidity\_percent\_contour

dv\_humidities\_relative\_humidity\_percent\_counts

dv\_humidity\_monthlies\_average\_dewpoint\_c

dv\_humidity\_monthlies\_average\_dewpoint\_c\_contour

dv\_humidity\_monthlies\_average\_dewpoint\_c\_counts

dv\_humidity\_monthlies\_average\_relative\_humidity\_percent

dv\_humidity\_monthlies\_average\_relative\_humidity\_percent\_contour

dv\_humidity\_monthlies\_average\_relative\_humidity\_percent\_counts

dv\_humidity\_monthlies\_max\_relative\_humidity\_percent

dv\_humidity\_monthlies\_max\_relative\_humidity\_percent\_contour

dv\_humidity\_monthlies\_max\_relative\_humidity\_percent\_counts

dv\_humidity\_monthlies\_maximum\_dewpoint\_c

dv\_humidity\_monthlies\_maximum\_dewpoint\_c\_contour

dv\_humidity\_monthlies\_maximum\_dewpoint\_c\_counts

dv\_humidity\_monthlies\_min\_relative\_humidity\_percent

dv\_humidity\_monthlies\_min\_relative\_humidity\_percent\_contour

dv\_humidity\_monthlies\_min\_relative\_humidity\_percent\_counts

dv\_humidity\_monthlies\_minimum\_dewpoint\_c

dv\_humidity\_monthlies\_minimum\_dewpoint\_c\_contour

dv\_humidity\_monthlies\_minimum\_dewpoint\_c\_counts

dv\_humidity\_noons

dv\_humidity\_noons\_counts

dv\_humidity\_noons\_dewpoint

dv\_humidity\_noons\_dewpoint\_contour

dv\_humidity\_noons\_dewpoint\_counts

dv\_humidity\_noons\_relative\_humidity\_percent

dv\_humidity\_noons\_relative\_humidity\_percent\_contour

dv\_humidity\_noons\_relative\_humidity\_percent\_counts

dv\_hydrology\_alkalinities

dv\_hydrology\_alkalinities\_alkalinity\_via\_direct\_mgl

dv\_hydrology\_alkalinities\_alkalinity\_via\_direct\_mgl\_counts

dv\_hydrology\_alkalinities\_alkalinity\_via\_drop\_mgl

dv\_hydrology\_alkalinities\_alkalinity\_via\_drop\_mgl\_counts

dv\_hydrology\_phs

dv\_hydrology\_phs\_ph

dv\_hydrology\_phs\_ph\_contour

dv\_hydrology\_phs\_ph\_counts

dv\_land\_covers\_muc\_code

dv\_land\_covers\_muc\_code\_counts

dv\_land\_covers\_primary\_photo\_url

dv\_land\_covers\_primary\_photo\_url\_counts

dv\_lilacs\_cloned\_end\_bloom

dv\_lilacs\_cloned\_end\_bloom\_counts

dv\_lilacs\_cloned\_first\_bloom

dv\_lilacs\_cloned\_first\_bloom\_counts

dv\_lilacs\_cloned\_first\_leaf

dv\_lilacs\_cloned\_first\_leaf\_counts

dv\_lilacs\_cloned\_full\_bloom

dv\_lilacs\_cloned\_full\_bloom\_counts

dv\_lilacs\_cloned\_full\_leaf

dv\_lilacs\_cloned\_full\_leaf\_counts

dv\_lilacs\_common\_end\_bloom

dv\_lilacs\_common\_end\_bloom\_counts

dv\_lilacs\_common\_first\_bloom

dv\_lilacs\_common\_first\_bloom\_counts

dv\_lilacs\_common\_first\_leaf

dv\_lilacs\_common\_first\_leaf\_counts

dv\_lilacs\_common\_full\_bloom

dv\_lilacs\_common\_full\_bloom\_counts

dv\_lilacs\_common\_full\_leaf

dv\_lilacs\_common\_full\_leaf\_counts

dv\_mosquito\_habitat\_mapper\_breeding\_ground\_eliminated

dv\_mosquito\_habitat\_mapper\_breeding\_ground\_eliminated\_counts

dv\_mosquito\_habitat\_mapper\_genus

dv\_mosquito\_habitat\_mapper\_genus\_counts

dv\_mosquito\_habitat\_mapper\_primary\_photo\_url

dv\_mosquito\_habitat\_mapper\_primary\_photo\_url\_counts

dv\_mosquito\_habitat\_mapper\_water\_source\_type

dv\_mosquito\_habitat\_mapper\_water\_source\_type\_counts

dv\_mosquitoes\_larvae\_count\_ratio

dv\_mosquitoes\_larvae\_count\_ratio\_counts

dv\_nitrates

dv\_nitrates\_nitrate\_and\_nitrite\_mgl

dv\_nitrates\_nitrate\_and\_nitrite\_mgl\_contour

dv\_nitrates\_nitrate\_and\_nitrite\_mgl\_counts

dv\_nitrates\_nitrite\_only\_mgl

dv\_nitrates\_nitrite\_only\_mgl\_contour

dv\_nitrates\_nitrite\_only\_mgl\_counts

dv\_ozone\_one\_hour\_after\_noons\_ozone\_ppb

dv\_ozone\_one\_hour\_after\_noons\_ozone\_ppb\_contour

dv\_ozone\_one\_hour\_after\_noons\_ozone\_ppb\_counts

dv\_ozones\_ozone\_ppb

dv\_ozones\_ozone\_ppb\_contour

dv\_ozones\_ozone\_ppb\_counts

dv\_phenological\_gardens\_BF

dv\_phenological\_gardens\_BF\_counts

dv\_phenological\_gardens\_EF

dv\_phenological\_gardens\_EF\_counts

dv\_phenological\_gardens\_GF

dv\_phenological\_gardens\_GF\_counts

dv\_precipitation\_monthlies\_liquid\_accumulation\_mm

dv\_precipitation\_monthlies\_liquid\_accumulation\_mm\_contour

dv\_precipitation\_monthlies\_liquid\_accumulation\_mm\_counts

dv\_precipitations

dv\_precipitations\_liquid\_accumulation

dv\_precipitations\_liquid\_accumulation\_contour

dv\_precipitations\_liquid\_accumulation\_counts

dv\_precipitations\_occurrence\_type

dv\_precipitations\_occurrence\_type\_counts

dv\_precipitations\_ph

dv\_precipitations\_ph\_contour

dv\_precipitations\_ph\_counts

dv\_precipitations\_snowfall\_accumulation

dv\_precipitations\_snowfall\_accumulation\_contour

dv\_precipitations\_snowfall\_accumulation\_counts

dv\_precipitations\_vis\_rain\_depth

dv\_precipitations\_vis\_rain\_depth\_contour

dv\_precipitations\_vis\_rain\_depth\_counts

dv\_precipitations\_vis\_snow\_depth

dv\_precipitations\_vis\_snow\_depth\_contour

dv\_precipitations\_vis\_snow\_depth\_counts

dv\_precipitations\_vis\_total\_liquid\_equivalent

dv\_precipitations\_vis\_total\_liquid\_equivalent\_contour

dv\_precipitations\_vis\_total\_liquid\_equivalent\_counts

dv\_salinities

dv\_salinities\_salinity\_via\_hydrometer\_ppt

dv\_salinities\_salinity\_via\_hydrometer\_ppt\_contour

dv\_salinities\_salinity\_via\_hydrometer\_ppt\_counts

dv\_salinities\_salinity\_via\_titration\_ppt

dv\_salinities\_salinity\_via\_titration\_ppt\_contour

dv\_salinities\_salinity\_via\_titration\_ppt\_counts

dv\_sky\_condition\_noons

dv\_sky\_condition\_noons\_altocumulus

dv\_sky\_condition\_noons\_altocumulus\_counts

dv\_sky\_condition\_noons\_altostratus

dv\_sky\_condition\_noons\_altostratus\_counts

dv\_sky\_condition\_noons\_cirrocumulus

dv\_sky\_condition\_noons\_cirrocumulus\_counts

dv\_sky\_condition\_noons\_cirrostratus

dv\_sky\_condition\_noons\_cirrostratus\_counts

dv\_sky\_condition\_noons\_cirrus

dv\_sky\_condition\_noons\_cirrus\_counts

dv\_sky\_condition\_noons\_cloud\_cover

dv\_sky\_condition\_noons\_cloud\_cover\_counts

dv\_sky\_condition\_noons\_cloud\_types

dv\_sky\_condition\_noons\_cloud\_types\_counts

dv\_sky\_condition\_noons\_contrail\_cover

dv\_sky\_condition\_noons\_contrail\_cover\_counts

dv\_sky\_condition\_noons\_cumulonimbus

dv\_sky\_condition\_noons\_cumulonimbus\_counts

dv\_sky\_condition\_noons\_cumulus

dv\_sky\_condition\_noons\_cumulus\_counts

dv\_sky\_condition\_noons\_nimbostratus

dv\_sky\_condition\_noons\_nimbostratus\_counts

dv\_sky\_condition\_noons\_non\_spreading\_contrails

dv\_sky\_condition\_noons\_non\_spreading\_contrails\_counts

dv\_sky\_condition\_noons\_short\_lived\_contrails

dv\_sky\_condition\_noons\_short\_lived\_contrails\_counts

dv\_sky\_condition\_noons\_sky\_clarity

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dv\_sky\_condition\_noons\_spreading\_contrails

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dv\_sky\_condition\_noons\_stratus\_counts

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dv\_sky\_conditions\_altocumulus\_counts

dv\_sky\_conditions\_altostratus

dv\_sky\_conditions\_altostratus\_counts

dv\_sky\_conditions\_cirrocumulus

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dv\_sky\_conditions\_cirrostratus

dv\_sky\_conditions\_cirrostratus\_counts

dv\_sky\_conditions\_cirrus

dv\_sky\_conditions\_cirrus\_counts

dv\_sky\_conditions\_cloud\_cover

dv\_sky\_conditions\_cloud\_cover\_counts

dv\_sky\_conditions\_cloud\_types

dv\_sky\_conditions\_cloud\_types\_counts

dv\_sky\_conditions\_contrail\_cover

dv\_sky\_conditions\_contrail\_cover\_counts

dv\_sky\_conditions\_cumulonimbus

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dv\_sky\_conditions\_cumulus

dv\_sky\_conditions\_cumulus\_counts

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dv\_sky\_conditions\_sky\_color\_counts

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dv\_sky\_conditions\_stratocumulus\_counts

dv\_sky\_conditions\_stratus

dv\_sky\_conditions\_stratus\_counts

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dv\_snowpacks\_liquid\_equivalent\_contour

dv\_snowpacks\_liquid\_equivalent\_counts

dv\_snowpacks\_ph

dv\_snowpacks\_ph\_contour

dv\_snowpacks\_ph\_counts

dv\_snowpacks\_snow\_depth

dv\_snowpacks\_snow\_depth\_contour

dv\_snowpacks\_snow\_depth\_counts

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dv\_surface\_temperature\_noons\_contour

dv\_surface\_temperature\_noons\_counts

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dv\_surface\_temperatures\_average\_surface\_temperature\_c\_contour

dv\_surface\_temperatures\_average\_surface\_temperature\_c\_counts

dv\_surface\_temperatures\_contour

dv\_surface\_temperatures\_counts

dv\_transparencies

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dv\_transparencies\_transparency\_disk\_image\_disappearance\_m\_contour

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dv\_transparencies\_tube\_image\_disappearance\_cm\_contour

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dv\_tree\_heights\_primary\_photo\_url\_counts

dv\_tree\_heights\_tree\_height\_avg\_m

dv\_tree\_heights\_tree\_height\_avg\_m\_counts

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dv\_water\_temperatures\_counts

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dv\_water\_temperatures\_water\_temp\_c\_contour

dv\_water\_temperatures\_water\_temp\_c\_counts

dv\_water\_vapors

dv\_water\_vapors\_precipital\_water

dv\_water\_vapors\_precipital\_water\_contour

dv\_water\_vapors\_precipital\_water\_counts

**Protocol Measurement Legends**

GLOBE Visualization has an associated Legend graphic designed for each protocol measurements. Each legend graphic can be currently obtained by clicking on the “Legend” tab, after requesting the measurement layers on <https://vis.globe.gov> and bringing up the appropriate measurement layers.