

# Cross Section View



This icon is a plotting specification for cross section plots from a suitable GRIB [data source](#) . It can also take the output from a [Cross Section Data](#) icon as an input. In this case, a consistency check is performed between the parameters that are common to both icons.

In addition to the parameters required for the cross section computation, this icon specifies the axis details as well as the plot positioning in the plot frame of the display window / paper sheet and the overlay of different data units in the same plot.

To access the computed output values use the [Cross Section Data](#) icon.

If an orography is plotted it can be customised by applying a [Graph Plotting](#) visual definition icon.

For further details on the role and usage of View icons in the visualisation process, please see [Analysis Views](#).

The macro language equivalent is `mxsectview()` .

## The Cross Section View Editor

### Bottom Level

Specifies the lower limit of the cross section, as a pressure level (hPa) or model level ( levels).

### Top Level

Specifies the upper limit of the cross section, as a pressure level (hPa) or model level ( levels).

### Line

Specifies the coordinates of a transect line along which the cross-section is calculated in `lat1/lon1/lat2/lon2` format.

The cross section is calculated from a set of geographical points taken along the input transect line. The point selection takes into consideration the resolution of the data and assures that a minimum of 64 points will be used.

Note that it is possible to define a line through either **pole** by describing the line's coordinates as follows:

- First, when specifying the latitudes of the two points, imagine that the latitude values go above 90 when you cross the North Pole and below -90 when you cross the South Pole.
- Next, if you wish a straight line, ensure that the two longitude values are the same as each other.

An example demonstrates this. Say you wanted to defined a straight-line cross-section from 60S/25E to 60S/155W. This would be specified as -60/25/-120/25. The fact that one of the latitude values is below -90 indicates to Metview that a cross-section going through the South Pole is desired. Once this has been established, the fact that the two longitude values are identical tells Metview to use a straight line through the pole. If this is the intent, then only one unique longitude value is required, as the other one can be deduced. Giving Metview two different longitude values will cause a cross-section consisting of two curves to be produced.

### Wind Parallel

When this option is **On**, the wind components are projected onto the cross section plane. For 2D wind the result is a signed scalar data (a contour plot). When 3D wind data are available a vector plot is produced with the vertical component scaled/computed as specified in parameter **W Wind Scaling Factor Mode**. Valid values are **On/Off**.

### Wind Perpendicular

When this option is **On**, the wind components are projected onto the normal vector of the cross section plane. The result is a signed scalar data (a contour plot). Valid values are **On/Off**. This cannot be set to **On** if **Wind Parallel** is also **On**.

### Wind Intensity

When this option is **On** the result depends on other settings:

- When both **Wind Parallel** and **Wind Perpendicular** are **Off**, the result is the length of the 2D/3D wind vector at the cross section plane
- When **Wind Parallel** is **On**, the result is the absolute value of the projected wind onto the cross section plane
- When **Wind Perpendicular** is **On**, the result is the absolute value of the wind projected onto the normal vector of the cross section plane

Valid values are **On/Off**.

## LnsP Param

Specifies the ecCodes **paramId** of the LNSP data. The default value is **152** (as used by ECMWF).

## U Wind Param

Specifies the ecCodes **paramId** of the U wind component data. The default value is **131** (as used by ECMWF).

## V Wind Param

Specifies the ecCodes **paramId** of the V wind component data. The default value is **132** (as used by ECMWF).

## W Wind Param

Specifies the ecCodes **paramId** of the vertical wind component data. The default value is **135** i.e. pressure velocity (as used by ECMWF).

## T Param

Specifies the ecCodes **paramId** of the temperature data used in the vertical wind computations when **W Wind Scaling Factor Mode** is set to Compute. The default value is **130** (as used by ECMWF).

## Horizontal Point Mode

Specifies how the geographical points along the input transect line will be computed. Valid values are **Interpolate** and **Nearest Gridpoint**. Setting this option to Interpolate will create a regular set of interpolated geographical points along the transect line. Setting this option to **Nearest Gridpoint** will instead select the nearest points from the data.

## Vertical Coordinates

Setting this option to **User** will enable the use of general height-based coordinates. In this mode, additional GRIB fields should be supplied (one per level) where the values of the grid points represent the heights of their locations. Valid values are **Default** and **User**. The default value is **Default**.

## Vertical Coordinate Param

Specifies the ecCodes **paramId** of the general height-based coordinates if **Vertical Coordinates** is set to **User**.

## Vertical Coordinate Extrapolate

When it is set to **On** the data is extrapolated onto extra levels below and above the actual height range. The possible values are **On** and **Off**. The default value is **Off**. This parameter is only enabled when **Vertical Coordinates** is set to **User**.

## W Wind Scaling Factor Mode

Specifies the representation of the vertical wind component (defined as **W Wind Param**). The valid values are as follows:

- **Automatic**: the values are scaled by a factor based on the geographical area, the top/bottom pressure levels and the size of the plot window.
- **User**: the values are scaled by the factor defined via parameter **W Wind Scaling Factor**.
- **Compute**: in this mode, supposing that **W Wind Param** defines the the pressure velocity, the vertical wind component in m/s is computed using the following hydrostatic formula:

$$w = - \frac{\omega R T}{p g}$$

where:

- $\omega$  : pressure velocity (Pa/s)
- $p$  : pressure on (Pa)
- $T$  : temperature (K)
- $R$  : gas constant, 287.058 J kg<sup>-1</sup> K<sup>-1</sup>
- $g$  : gravitational acceleration, 9.81 m/s<sup>2</sup>

To make this formula work, the input data have to be specified either on pressure levels or on model levels together with LNSP. The temperature's **paramId** is defined by **T Param**. When temperature is not available, the computations still work but  $T$  is replaced by a constant 273.16 K value in the formula. Having computed the vertical wind component, a scaling with the factor defined by **W Wind Scaling Factor** is still applied to the resulting values.

The default value is **Automatic**.

## W Wind Scaling Factor

Specifies the vertical wind scaling factor if **W Wind Scaling Factor Mode** is set to **User** or **Compute**. The default value is **-100**.

## Level Selection Type

Specifies the method to define the output pressure levels when converting model level data to pressure levels. Options are:

- **From Data** (default)
  - compute the absolute bottom pressure level from the data
  - for each model level, compute the average pressure along the cross section line and then use this mean pressure as the vertical pressure co-ordinate for that level
  - compute extra levels at the bottom by adding an offset (10 hPa) until it reaches the bottom pressure level, computed previously. This will avoid blank areas in the plot near the orography line.
- **Count**
  - calculate the output pressure levels by taking into account the bottom and top pressure levels (**Bottom Level** and **Top Level**) and the given number of levels (**Level Count**). The computed levels will be evenly spaced on either a linear or a logarithmic scale depending on the value of **Vertical Scaling**.
- **Level List**
  - use the given list of pressure levels (**Level List**)

## Level List

Specifies the list of output pressure levels. Only available if **Level Selection Type** is set to **Level List**.

## Level Count

Specifies the number of output pressure levels if **Level Selection Type** is set to **Count**.

## Vertical Scaling

Specifies the type of vertical axis - **Linear** or **Logarithmic**.

## Horizontal Axis

Specifies the plotting attributes of the horizontal axis. An [Axis Plotting](#) icon can be dropped here.

## Vertical Axis

Specifies the plotting attributes of the vertical axis. An [Axis Plotting](#) icon can be dropped here.

## Subpage X Position

Specifies the X offset of the plot from the left side of the plot frame (any subdivision of the display area). This is expressed as a percentage of the X-dimension of the plot frame.

## Subpage Y Position

Specifies the Y offset of the plot from the bottom side of the plot frame (any subdivision of the display area). This is expressed as a percentage of the Y-dimension of the plot frame.

## Subpage X Length

Specifies the X length of the plot. This is expressed as a percentage of the X-dimension of the plot frame. Hence the sum of this X length plus the X offset cannot exceed 100 (it is advised that it does not exceed 95 since you need some margin on the right for things like axis or map grid labels).

## Subpage Y Length

As above but for the Y length of the plot.

## Page Frame

Toggles the plotting of a border line around the plot frame *On / Off*.

## Page Frame Parameters

Comprising **Page Frame Colour**, **Page Frame Line Style** and **Page Frame Thickness**, these parameters specify the characteristics of the plot frame border line. Only available when **Page Frame** is **On**.

## Page Id Line

Toggles the plotting of plot identification line *On / Off*.

## Page Id Line User Text

Specifies user text to be added to the plot identification line. Only available when **Page Id Line** is **On** .

## Subpage Frame

Toggles the plotting of a border line around the plot itself *On / Off* . In most cases you will want this to be left *On* . When *Off* the sides of the plot not equipped with axis will not be plotted.

## Subpage Frame Parameters

Comprising **Subpage Frame Colour**, **Subpage Frame Line Style** and **Subpage Frame Thickness**, these parameters specify the characteristics of the plot frame border line. Only available when **Subpage Frame** is **On** .

## Subpage Background Colour

Specifies the colour of the background of the plot (i.e. not affected by visual definitions like contour shadings or lines).