

PostGIS 3.3 Raster Cheatsheet

New in this release ¹ Enhanced in this release ² Requires GEOS 3.9 or higher^{3,9} aggregate ⁹⁹ 2.5/3D support^{3d} SQL-MM^{mm} Supports geography ^G

Raster Support Data types

geomval A spatial datatype with two fields - geom (holding a geometry object) and val (holding a double precision pixel value from a raster band).

addbandarg A composite type used as input into the ST_AddBand function defining the attributes and initial value of the new band.

rastbandarg A composite type for use when needing to express a raster and a band index of that raster.

raster raster spatial data type.

reclassarg A composite type used as input into the ST_Reclass function defining the behavior of reclassification.

summarystats A composite type returned by the ST_SummaryStats and ST_SummaryStatsAgg functions.

unionarg A composite type used as input into the ST_Union function defining the bands to be processed and behavior of the UNION operation.

Raster Management

AddRasterConstraints Adds raster constraints to a loaded raster table for a specific column that constrains spatial ref, scaling, blocksize, alignment, bands, band type and a flag to denote if raster column is regularly blocked. The table must be loaded with data for the constraints to be inferred. Returns true if the constraint setting was accomplished and issues a notice otherwise.

1. rasttable, rastcolumn, srid=true, scale_x=true, scale_y=true, blocksize_x=true, blocksize_y=true, same_alignment=true, regular_blocking=false, num_bands=true, pixel_types=true, nodata_values=true, out_db=true, extent=true
2. rasttable, rastcolumn, VARIADIC constraints
3. rastschema, rasttable, rastcolumn, VARIADIC constraints
4. rastschema, rasttable, rastcolumn, srid=true, scale_x=true, scale_y=true, blocksize_x=true, blocksize_y=true, same_alignment=true, regular_blocking=false, num_bands=true, pixel_types=true, nodata_values=true, out_db=true, extent=true

DropRasterConstraints Drops PostGIS raster constraints that refer to a raster table column. Useful if you need to reload data or update your raster column data.

1. rasttable, rastcolumn, srid, scale_x, scale_y, blocksize_x, blocksize_y, same_alignment, regular_blocking, num_bands=true, pixel_types=true, nodata_values=true, out_db=true, extent=true
2. rastschema, rasttable, rastcolumn, srid=true, scale_x=true, scale_y=true, blocksize_x=true, blocksize_y=true, same_alignment=true, regular_blocking=false, num_bands=true, pixel_types=true, nodata_values=true, out_db=true, extent=true
3. rastschema, rasttable, rastcolumn, constraints

AddOverviewConstraints Tag a raster column as being an overview of another.

1. ovschema, ovtable, ovcolumn, refschema, reftable, refcolumn, ovfactor
2. ovtable, ovcolumn, reftable, refcolumn, ovfactor

DropOverviewConstraints Untag a raster column from being an overview of another.

1. ovschema, ovtable, ovcolumn
2. ovtable, ovcolumn

PostGIS_GDAL_Version () Reports the version of the GDAL library in use by PostGIS.

PostGIS_Raster_Lib_Build_Date () Reports full raster library build date.

PostGIS_Raster_Lib_Version () Reports full raster version and build configuration infos.

ST_GDALDrivers () Returns a list of raster formats supported by PostGIS through GDAL. Only those formats with can_write=True can be used by ST_AsGDALRaster

ST_Contour (rast, bandnumber, level_interval, level_base, fixed_levels, polygonize) Generates a set of vector contours from the provided raster band, using the GDAL contouring algorithm.

ST_InterpolateRaster (input_points, algorithm_options, template, template_band_num=1) Interpolates a gridded surface based on an input set of 3-d points, using the X- and Y-values to position the points on the grid and the Z-value of the points as the surface elevation.

UpdateRasterSRID Change the SRID of all rasters in the user-specified column and table.

1. schema_name, table_name, column_name, new_srid
2. table_name, column_name, new_srid

ST_CreateOverview (tab, col, factor, algo='NearestNeighbor') Create an reduced resolution version of a given raster coverage.

Raster Constructors

ST_AddBand Returns a raster with the new band(s) of given type added with given initial value in the given index location. If no index is specified, the band is added to the end.

1. rast, addbandargset
2. rast, index, pixeltype, initialvalue=0, nodataval=NULL
3. rast, pixeltype, initialvalue=0, nodataval=NULL
4. torast, fromrast, fromband=1, torastindex=at_end
5. torast, fromrasts, fromband=1, torastindex=at_end
6. rast, index, outdbfile, outdbindex, nodataval=NULL
7. rast, outdbfile, outdbindex, index=at_end, nodataval=NULL

ST_AsRaster Converts a PostGIS geometry to a PostGIS raster.

1. geom, ref, pixeltype, value=1, nodataval=0, touched=false
2. geom, ref, pixeltype=ARRAY['8BUI'], value=ARRAY[1], nodataval=ARRAY[0], touched=false
3. geom, scalex, scaley, gridx, gridy, pixeltype, value=1, nodataval=0, skewx=0, skewy=0, touched=false
4. geom, scalex, scaley, gridx=NULL, gridy=NULL, pixeltype=ARRAY['8BUI'], value=ARRAY[1], nodataval=ARRAY[0], skewx=0, skewy=0, touched=false
5. geom, scalex, scaley, pixeltype, value=1, nodataval=0, upperleftx=NULL, upperlefty=NULL, skewx=0, skewy=0, touched=false
6. geom, scalex, scaley, pixeltype, value=ARRAY[1], nodataval=ARRAY[0], upperleftx=NULL, upperlefty=NULL, skewx=0, skewy=0, touched=false
7. geom, width, height, gridx, gridy, pixeltype, value=1, nodataval=0, skewx=0, skewy=0, touched=false
8. geom, width, height, gridx=NULL, gridy=NULL, pixeltype=ARRAY['8BUI'], value=ARRAY[1], nodataval=ARRAY[0], skewx=0, skewy=0, touched=false
9. geom, width, height, pixeltype, value=1, nodataval=0, upperleftx=NULL, upperlefty=NULL, skewx=0, skewy=0, touched=false
10. geom, width, height, pixeltype, value=ARRAY[1], nodataval=ARRAY[0], upperleftx=NULL, upperlefty=NULL, skewx=0, skewy=0, touched=false

ST_Band Returns one or more bands of an existing raster as a new raster. Useful for building new rasters from existing rasters.

1. rast, nbands = ARRAY[1]
2. rast, nband
3. rast, nbands, delimiter=,

ST_MakeEmptyCoverage (tilewidth, tileheight, width, height, upperleftx, upperlefty, scalex, scaley, skewx, skewy, srid=unknown) Cover georeferenced area with a grid of empty raster tiles.

ST_MakeEmptyRaster Returns an empty raster (having no bands) of given dimensions (width & height), upperleft X and Y, pixel size and rotation (scalex, scaley, skewx & skewy) and reference system (srid). If a raster is passed in, returns a new raster with the same size, alignment and SRID. If srid is left out, the spatial ref is set to unknown (0).

1. rast
2. width, height, upperleftx, upperlefty, scalex, scaley, skewx, skewy, srid=unknown
3. width, height, upperleftx, upperlefty, pixelsize

ST_Tile Returns a set of rasters resulting from the split of the input raster based upon the desired dimensions of the output rasters.

1. rast, nband, width, height, padwithnodata=FALSE, nodataval=NULL
2. rast, nband, width, height, padwithnodata=FALSE, nodataval=NULL
3. rast, width, height, padwithnodata=FALSE, nodataval=NULL

ST_Retile (tab, col, ext, sfx, sfy, tw, th, algo='NearestNeighbor') Return a set of configured tiles from an arbitrarily tiled raster coverage.

ST_FromGDALRaster (gdaldata, srid=NULL) Returns a raster from a supported GDAL raster file.

Raster Accessors

ST_GeoReference (rast, format=GDAL) Returns the georeference meta data in GDAL or ESRI format as commonly seen in a world file. Default is GDAL.

ST_Height (rast) Returns the height of the raster in pixels.

ST_IsEmpty (rast) Returns true if the raster is empty (width = 0 and height = 0). Otherwise, returns false.

ST_MemSize (rast) Returns the amount of space (in bytes) the raster takes.

ST_MetaData (rast) Returns basic meta data about a raster object such as pixel size, rotation (skew), upper, lower left, etc.

ST_NumBands (rast) Returns the number of bands in the raster object.

ST_PixelHeight (rast) Returns the pixel height in geometric units of the spatial reference system.

ST_PixelWidth (rast) Returns the pixel width in geometric units of the spatial reference system.

ST_ScaleX (rast) Returns the X component of the pixel width in units of coordinate reference system.

ST_ScaleY (rast) Returns the Y component of the pixel height in units of coordinate reference system.

ST_RasterToWorldCoord (rast, xcolumn, yrow) Returns the raster's upper left corner as geometric X and Y (longitude and latitude) given a column and row. Column and row starts at 1.

ST_RasterToWorldCoordX Returns the geometric X coordinate upper left of a raster, column and row. Numbering of columns and rows starts at 1.

```
1. rast, xcolumn
2. rast, xcolumn, yrow
```

ST_RasterToWorldCoordY Returns the geometric Y coordinate upper left corner of a raster, column and row. Numbering of columns and rows starts at 1.

```
1. rast, yrow
2. rast, xcolumn, yrow
```

ST_Rotation (rast) Returns the rotation of the raster in radian.

ST_SkewX (rast) Returns the georeference X skew (or rotation parameter).

ST_SkewY (rast) Returns the georeference Y skew (or rotation parameter).

ST_SRID (rast) Returns the spatial reference identifier of the raster as defined in spatial_ref_sys table.

ST_Summary (rast) Returns a text summary of the contents of the raster.

ST_UpperLeftX (rast) Returns the upper left X coordinate of raster in projected spatial ref.

ST_UpperLeftY (rast) Returns the upper left Y coordinate of raster in projected spatial ref.

ST_Width (rast) Returns the width of the raster in pixels.

ST_WorldToRasterCoord Returns the upper left corner as column and row given geometric X and Y (longitude and latitude) or a point geometry expressed in the spatial reference coordinate system of the raster.

```
1. rast, pt
2. rast, longitude, latitude
```

ST_WorldToRasterCoordX Returns the column in the raster of the point geometry (pt) or a X and Y world coordinate (xw, yw) represented in world spatial reference system of raster.

```
1. rast, pt
2. rast, xw
3. rast, xw, yw
```

ST_WorldToRasterCoordY Returns the row in the raster of the point geometry (pt) or a X and Y world coordinate (xw, yw) represented in world spatial reference system of raster.

```
1. rast, pt
2. rast, xw
3. rast, xw, yw
```

Raster Band Accessors

ST_BandMetaData Returns basic meta data for a specific raster band. band num 1 is assumed if none-specified.

1. rast, band=1
2. rast, band

ST_BandNoDataValue (rast, bandnum=1) Returns the value in a given band that represents no data. If no band num 1 is assumed.

ST_BandsNoData Returns true if the band is filled with only nodata values.

1. rast, band, forceChecking=true
2. rast, forceChecking=true

ST_BandPath (rast, bandnum=1) Returns system file path to a band stored in file system. If no bandnum specified, 1 is assumed.

ST_BandFileSize (rast, bandnum=1) Returns the file size of a band stored in file system. If no bandnum specified, 1 is assumed.

ST_BandFileTimestamp (rast, bandnum=1) Returns the file timestamp of a band stored in file system. If no bandnum specified, 1 is assumed.

ST_BandPixelType (rast, bandnum=1) Returns the type of pixel for given band. If no bandnum specified, 1 is assumed.

ST_MinPossibleValue (pixetype) Returns the minimum value this pixeltype can store.

ST_HasNoBand (rast, bandnum=1) Returns true if there is no band with given band number. If no band number is specified, then band number 1 is assumed.

Raster Pixel Accessors and Setters

ST_PixelAsPolygon (rast, columnx, rowy) Returns the polygon geometry that bounds the pixel for a particular row and column.

ST_PixelAsPolygons (rast, band=1, exclude_nodata_value=TRUE) Returns the polygon geometry that bounds every pixel of a raster band along with the value, the X and the Y raster coordinates of each pixel.

ST_PixelAsPoint (rast, columnx, rowy) Returns a point geometry of the pixel's upper-left corner.

ST_PixelAsPoints (rast, band=1, exclude_nodata_value=TRUE) Returns a point geometry for each pixel of a raster band along with the value, the X and the Y raster coordinates of each pixel. The coordinates of the point geometry are of the pixel's upper-left corner.

ST_PixelAsCentroid (rast, x, y) Returns the centroid (point geometry) of the area represented by a pixel.

ST_PixelAsCentroids (rast, band=1, exclude_nodata_value=TRUE) Returns the centroid (point geometry) for each pixel of a raster band along with the value, the X and the Y raster coordinates of each pixel. The point geometry is the centroid of the area represented by a pixel.

ST_Value Returns the value of a given band in a given columnx, rowy pixel or at a particular geometric point. Band numbers start at 1 and assumed to be 1 if not specified. If exclude_nodata_value is set to false, then all pixels include nodata pixels are considered to intersect and return value. If exclude_nodata_value is not passed in then reads it from metadata of raster.

1. rast, pt, exclude_nodata_value=true
2. rast, band, pt, exclude_nodata_value=true, resample='nearest'
3. rast, x, y, exclude_nodata_value=true
4. rast, band, x, y, exclude_nodata_value=true

ST_NearestValue Returns the nearest non-NODATA value of a given band's pixel specified by a columnx and rowy or a geometric point expressed in the same spatial reference coordinate system as the raster.

1. rast, bandnum, pt, exclude_nodata_value=true
2. rast, pt, exclude_nodata_value=true
3. rast, bandnum, columnx, rowy, exclude_nodata_value=true
4. rast, columnx, rowy, exclude_nodata_value=true

ST_SetZ (rast, geom, resample=nearest, band=1) Returns a geometry with the same X/Y coordinates as the input geometry, and values from the raster copied into the Z dimension using the requested resample algorithm.

ST_SetM (rast, geom, resample=nearest, band=1) Returns a geometry with the same X/Y coordinates as the input geometry, and values from the raster copied into the Z dimension using the requested resample algorithm.

ST_Neighborhood Returns a 2-D double precision array of the non-NODATA values around a given band's pixel specified by either a columnX and rowY or a geometric point expressed in the same spatial reference coordinate system as the raster.

1. rast, bandnum, columnX, rowY, distanceX, distanceY, exclude_nodata_value=true
2. rast, columnX, rowY, distanceX, distanceY, exclude_nodata_value=true
3. rast, bandnum, pt, distanceX, distanceY, exclude_nodata_value=true
4. rast, pt, distanceX, distanceY, exclude_nodata_value=true

ST_SetValue Returns modified raster resulting from setting the value of a given band in a given columnx, rowy pixel or the pixels that intersect a particular geometry. Band numbers start at 1 and assumed to be 1 if not specified.

1. rast, bandnum, geom, newvalue
2. rast, geom, newvalue
3. rast, bandnum, columnx, rowy, newvalue
4. rast, columnx, rowy, newvalue

ST_SetValues Returns modified raster resulting from setting the values of a given band.

1. rast, nband, columnx, rowy, newvalueset, noset=NULL, keepnodata=FALSE
2. rast, nband, columnx, rowy, newvalueset, nosetvalue, keepnodata=FALSE
3. rast, nband, columnx, rowy, width, height, newvalue, keepnodata=FALSE
4. rast, columnx, rowy, width, height, newvalue, keepnodata=FALSE
5. rast, nband, geomvalset, keepnodata=FALSE

ST_DumpValues Get the values of the specified band as a 2-dimension array.

1. rast, nband=NULL, exclude_nodata_value=true
2. rast, nband, exclude_nodata_value=true

ST_PixelOfValue Get the columnx, rowy coordinates of the pixel whose value equals the search value.

1. rast, nband, search, exclude_nodata_value=true
2. rast, search, exclude_nodata_value=true
3. rast, nband, search, exclude_nodata_value=true
4. rast, search, exclude_nodata_value=true

Raster Editors

ST_SetGeoReference Set Georeference 6 georeference parameters in a single call. Numbers should be separated by white space. Accepts inputs in GDAL or ESRI format. Default is GDAL.

1. rast, georefcoords, format=GDAL
2. rast, upperleftx, upperlefty, scalex, scaley, skewx, skewy

ST_SetRotation (rast, rotation) Set the rotation of the raster in radian.

ST_SetScale Sets the X and Y size of pixels in units of coordinate reference system. Number units/pixel width/height.

1. rast, xy
2. rast, x, y

ST_SetSkew Sets the georeference X and Y skew (or rotation parameter). If only one is passed in, sets X and Y to the same value.

1. rast, skewxy
2. rast, skewx, skewy

ST_SetSRID (rast, srid) Sets the SRID of a raster to a particular integer srid defined in the spatial_ref_sys table.

ST_SetUpperLeft (rast, x, y) Sets the value of the upper left corner of the pixel of the raster to projected X and Y coordinates.

ST_Resample Resample a raster using a specified resampling algorithm, new dimensions, an arbitrary grid corner and a set of raster georeferencing attributes defined or borrowed from another raster.

1. rast, width, height, gridx=NULL, gridy=NULL, skewx=0, skewy=0, algorithm=NearestNeighbor, maxerr=0.125
2. rast, scalex=0, scaley=0, gridx=NULL, gridy=NULL, skewx=0, skewy=0, algorithm=NearestNeighbor, maxerr=0.125
3. rast, ref, algorithm=NearestNeighbor, maxerr=0.125, usescale=true
4. rast, ref, usescale, algorithm=NearestNeighbor, maxerr=0.125

ST_Rescale Resample a raster by adjusting only its scale (or pixel size). New pixel values are computed using the NearestNeighbor (english or american spelling), Bilinear, Cubic, CubicSpline or Lanczos resampling algorithm. Default is NearestNeighbor.

1. rast, scalexy, algorithm=NearestNeighbor, maxerr=0.125
2. rast, scalex, scaley, algorithm=NearestNeighbor, maxerr=0.125

ST_Reskew Resample a raster by adjusting only its skew (or rotation parameters). New pixel values are computed using the NearestNeighbor (english or american spelling), Bilinear, Cubic, CubicSpline or Lanczos resampling algorithm. Default is NearestNeighbor.

1. rast, skewxy, algorithm=NearestNeighbor, maxerr=0.125
2. rast, skewx, skewy, algorithm=NearestNeighbor, maxerr=0.125

ST_SnapToGrid Resample a raster by snapping it to a grid. New pixel values are computed using the NearestNeighbor (english or american spelling), Bilinear, Cubic, CubicSpline or Lanczos resampling algorithm. Default is NearestNeighbor.

1. rast, gridx, gridy, algorithm=NearestNeighbor, maxerr=0.125, scalex=DEFAULT 0, scaley=DEFAULT 0
2. rast, gridx, gridy, scalex, scaley, algorithm=NearestNeighbor, maxerr=0.125
3. rast, gridx, gridy, scalexy, algorithm=NearestNeighbor, maxerr=0.125

ST_Resize Resize a raster to a new width/height

1. rast, width, height, algorithm=NearestNeighbor, maxerr=0.125
2. rast, percentwidth, percentheight, algorithm=NearestNeighbor, maxerr=0.125
3. rast, width, height, algorithm=NearestNeighbor, maxerr=0.125

ST_Transform Reprojects a raster in a known spatial reference system to another known spatial reference system using specified resampling algorithm. Options are NearestNeighbor, Bilinear, Cubic, CubicSpline, Lanczos defaulting to NearestNeighbor.

1. rast, srid, algorithm=NearestNeighbor, maxerr=0.125, scalex, scaley
2. rast, srid, scalex, scaley, algorithm=NearestNeighbor, maxerr=0.125
3. rast, alignto, algorithm=NearestNeighbor, maxerr=0.125

Raster Band Editors

ST_SetBandNoDataValue Sets the value for the given band that represents no data. Band 1 is assumed if no band is specified. To mark a band as having no nodata value, set the nodata value = NULL.

1. `rast, nodatavalue`
2. `rast, band, nodatavalue, forcechecking=false`

ST_SetBandIsNoData (`rast, band=1`) Sets the isnodata flag of the band to TRUE.

ST_SetBandPath (`rast, band, outdbpath, outdbindex, force=false`) Update the external path and band number of an out-db band

ST_SetBandIndex (`rast, band, outdbindex, force=false`) Update the external band number of an out-db band

Raster Band Statistics and Analytics

ST_Count Returns the number of pixels in a given band of a raster or raster coverage. If no band is specified defaults to band 1. If `exclude_nodata_value` is set to true, will only count pixels that are not equal to the nodata value.

1. `rast, nband=1, exclude_nodata_value=true`
2. `rast, exclude_nodata_value`

ST_CountAgg Aggregate. Returns the number of pixels in a given band of a set of rasters. If no band is specified defaults to band 1. If `exclude_nodata_value` is set to true, will only count pixels that are not equal to the NODATA value.

1. `rast, nband, exclude_nodata_value, sample_percent agg`
2. `rast, nband, exclude_nodata_value agg`
3. `rast, exclude_nodata_value agg`

ST_Histogram Returns a set of record summarizing a raster or raster coverage data distribution separate bin ranges. Number of bins are autocomputed if not specified.

1. `rast, nband=1, exclude_nodata_value=true, bins=autocomputed, width=NULL, right=false`
2. `rast, nband, bins, width=NULL, right=false`
3. `rast, nband, exclude_nodata_value, bins, right`
4. `rast, nband, bins, right`

ST_Quantile Compute quantiles for a raster or raster table coverage in the context of the sample or population. Thus, a value could be examined to be at the raster's 25%, 50%, 75% percentile.

1. `rast, nband=1, exclude_nodata_value=true, quantiles=NULL`
2. `rast, quantiles`
3. `rast, nband, quantiles`
4. `rast, quantile`
5. `rast, exclude_nodata_value, quantile=NULL`
6. `rast, nband, quantile`
7. `rast, nband, exclude_nodata_value, quantile`
8. `rast, nband, quantile`

ST_SummaryStats Returns summarystats consisting of count, sum, mean, stddev, min, max for a given raster band of a raster or raster coverage. Band 1 is assumed is no band is specified.

1. `rast, exclude_nodata_value`
2. `rast, nband, exclude_nodata_value`

ST_SummaryStatsAgg Aggregate. Returns summarystats consisting of count, sum, mean, stddev, min, max for a given raster band of a set of raster. Band 1 is assumed is no band is specified.

1. `rast, nband, exclude_nodata_value, sample_percent agg`
2. `rast, exclude_nodata_value, sample_percent agg`
3. `rast, nband, exclude_nodata_value agg`

ST_ValueCount Returns a set of records containing a pixel band value and count of the number of pixels in a given band of a raster (or a raster coverage) that have a given set of values. If no band is specified defaults to band 1. By default nodata value pixels are not counted. and all other values in the pixel are output and pixel band values are rounded to the nearest integer.

1. `rast, nband=1, exclude_nodata_value=true, searchvalues=NULL, roundto=0, agg`
2. `rast, nband, searchvalues, roundto=0, agg`
3. `rast, searchvalues, roundto=0, agg`
4. `rast, searchvalue, roundto=0 agg`
5. `rast, nband, exclude_nodata_value, searchvalue, roundto=0 agg`
6. `rast, nband, searchvalue, roundto=0 agg`
7. `rastertable, rastercolumn, nband=1, exclude_nodata_value=true, searchvalues=NULL, roundto=0,`
8. `rastertable, rastercolumn, searchvalues, roundto=0,`
9. `rastertable, rastercolumn, nband, searchvalues, roundto=0,`
10. `rastertable, rastercolumn, nband, exclude_nodata_value, searchvalue, roundto=0`
11. `rastertable, rastercolumn, searchvalue, roundto=0`
12. `rastertable, rastercolumn, nband, searchvalue, roundto=0`

Raster Inputs

ST_RastFromWKB (wkb) Return a raster value from a Well-Known Binary (WKB) raster.

ST_RastFromHexWKB (wkb) Return a raster value from a Hex representation of Well-Known Binary (WKB) raster.

Raster Outputs

ST_AsBinary/ST_AsWKB Return the Well-Known Binary (WKB) representation of the raster.

1. `rast, outasin=FALSE`
2. `rast, outasin=FALSE`

ST_AsHexWKB (`rast, outasin=FALSE`) Return the Well-Known Binary (WKB) in Hex representation of the raster.

ST_AsGDALRaster (`rast, format, options=NULL, srid=sameassource`) Return the raster tile in the designated GDAL Raster format. Raster formats are one of those supported by your compiled library. Use `ST_GDALDrivers()` to get a list of formats supported by your library.

ST_AsJPEG Return the raster tile selected bands as a single Joint Photographic Exports Group (JPEG) image (byte array). If no band is specified and 1 or more than 3 bands, then only the first band is used. If only 3 bands then all 3 bands are used and mapped to RGB.

1. `rast, options=NULL`
2. `rast, nband, quality`
3. `rast, nband, options=NULL`
4. `rast, nbands, options=NULL`
5. `rast, nbands, quality`

ST_AsPNG Return the raster tile selected bands as a single portable network graphics (PNG) image (byte array). If 1, 3, or 4 bands in raster and no bands are specified, then all bands are used. If more 2 or more than 4 bands and no bands specified, then only band 1 is used. Bands are mapped to RGB or RGBA space.

1. `rast, options=NULL`
2. `rast, nband, compression`
3. `rast, nband, options=NULL`
4. `rast, nbands, compression`
5. `rast, nbands, options=NULL`

ST_AsTIFF Return the raster selected bands as a single TIFF image (byte array). If no band is specified or any of specified bands does not exist in the raster, then will try to use all bands.

1. `rast, options='', srid=sameassource`
2. `rast, compression='', srid=sameassource`
3. `rast, nbands, compression='', srid=sameassource`
4. `rast, nbands, options, srid=sameassource`

Raster Processing: Map Algebra

ST_Clip Returns the raster clipped by the input geometry. If band number not is specified, all bands are processed. If crop is not specified or TRUE, the output raster is cropped.

1. rast, nband, geom, nodataval=NULL, crop=TRUE
2. rast, nband, geom, nodataval, crop=TRUE
3. rast, nband, geom, crop
4. rast, geom, nodataval=NULL, crop=TRUE
5. rast, geom, nodataval, crop=TRUE
6. rast, geom, crop

ST_ColorMap Creates a new raster of up to four 8BUI bands (grayscale, RGB, RGBA) from the source raster and a specified band. Band 1 is assumed if not specified.

1. rast, nband=1, colormap=grayscale, method=INTERPOLATE
2. rast, colormap, method=INTERPOLATE

ST_Grayscale Creates a new one-8BUI band raster from the source raster and specified bands representing Red, Green and Blue

1. rast, redband=1, greenband=2, blueband=3, extenttype=INTERSECTION
2. rastbandargset, extenttype=INTERSECTION

ST_Intersection Returns a raster or a set of geometry-pixelvalue pairs representing the shared portion of two rasters or the geometrical intersection of a vectorization of the raster and a geometry.

1. geom, rast, band_num=1
2. rast, geom
3. rast, band, geomin
4. rast1, rast2, nodataval
5. rast1, rast2, returnband, nodataval
6. rast1, band1, rast2, band2, nodataval
7. rast1, band1, rast2, band2, returnband, nodataval

ST_MapAlgebra (callback function version) Callback function version - Returns a one-band raster given one or more input rasters, band indexes and one user-specified callback function.

1. rastbandargset, callbackfunc, pixeltype=NULL, extenttype=INTERSECTION, customextent=NULL, distance=0, distancey=0, VARIADIC userargs=NULL
2. rast, nband, callbackfunc, pixeltype=NULL, extenttype=FIRST, customextent=NULL, distance=0, distancey=0, VARIADIC userargs=NULL
3. rast, nband, callbackfunc, pixeltype=NULL, extenttype=FIRST, customextent=NULL, distance=0, distancey=0, VARIADIC userargs=NULL
4. rast1, nband1, rast2, nband2, callbackfunc, pixeltype=NULL, extenttype=INTERSECTION, customextent=NULL, distance=0, distancey=0, VARIADIC userargs=NULL
5. rast, nband, callbackfunc, mask, weighted, pixeltype=NULL, extenttype=INTERSECTION, customextent=NULL, VARIADIC userargs=NULL

ST_MapAlgebra (expression version) Expression version - Returns a one-band raster given one or two input rasters, band indexes and one or more user-specified SQL expressions.

1. rast, nband, pixeltype, expression, nodataval=NULL
2. rast, pixeltype, expression, nodataval=NULL
3. rast1, nband1, rast2, nband2, expression, pixeltype=NULL, extenttype=INTERSECTION, nodataexpr=NULL, nodata2expr=NULL, nodatanodataval=NULL
4. rast1, rast2, expression, pixeltype=NULL, extenttype=INTERSECTION, nodataexpr=NULL, nodata2expr=NULL, nodatanodataval=NULL

ST_MapAlgebraExpr 1 raster band version: Creates a new one band raster formed by applying a valid PostgreSQL algebraic operation on the input raster band and of pixeltype provided. Band 1 is assumed if no band is specified.

1. rast, band, pixeltype, expression, nodataval=NULL
2. rast, pixeltype, expression, nodataval=NULL

ST_MapAlgebraExpr 2 raster band version: Creates a new one band raster formed by applying a valid PostgreSQL algebraic operation on the two input raster bands and of pixeltype provided. band 1 of each raster is assumed if no band numbers are specified. The resulting raster will be aligned (scale, skew and pixel corners) on the grid defined by the first raster and have its extent defined by the "extenttype" parameter. Values for "extenttype" can be: INTERSECTION, UNION, FIRST, SECOND.

1. rast1, rast2, expression, pixeltype=same_as_rast1_band, extenttype=INTERSECTION, nodataexpr=NULL, nodata2expr=NULL, nodatanodataaval=NULL
2. rast1, band1, rast2, band2, expression, pixeltype=same_as_rast1_band, extenttype=INTERSECTION, nodataexpr=NULL, nodata2expr=NULL, nodatanodataaval=NULL

ST_MapAlgebraFct 1 band version - Creates a new one band raster formed by applying a valid PostgreSQL function on the input raster band and of pixeltype provided. Band 1 is assumed if no band is specified.

1. rast, onerasteruserfunc
2. rast, onerasteruserfunc, VARIADIC args
3. rast, pixeltype, onerasteruserfunc
4. rast, pixeltype, onerasteruserfunc, VARIADIC args
5. rast, band, onerasteruserfunc
6. rast, band, onerasteruserfunc, VARIADIC args
7. rast, band, pixeltype, onerasteruserfunc
8. rast, band, pixeltype, onerasteruserfunc, VARIADIC args

ST_MapAlgebraFct 2 band version - Creates a new one band raster formed by applying a valid PostgreSQL function on the 2 input raster bands and of pixeltype provided. Band 1 is assumed if no band is specified. Extent type defaults to INTERSECTION if not specified.

1. rast1, rast2, tworasteruserfunc, pixeltype=same_as_rast1, extenttype=INTERSECTION, VARIADIC userargs
2. rast1, band1, rast2, band2, tworasteruserfunc, pixeltype=same_as_rast1, extenttype=INTERSECTION, VARIADIC userargs

ST_MapAlgebraFctNgb (rast, band, pixeltype, ngbwidth, ngbheight, onerastngbuserfunc, nodatamode, VARIADIC args) 1-band version: Map Algebra Nearest Neighbor using user-defined PostgreSQL function. Return a raster which values are the result of a PLPGSQL user function involving a neighborhood of values from the input raster band.

ST_Reclass Creates a new raster composed of band types reclassified from original. The nband is the band to be changed. If nband is not specified assumed to be 1. All other bands are returned unchanged. Use case: convert a 16BUI band to a 8BUI and so forth for simpler rendering as viewable formats.

1. rast, nband, reclassexpr, pixeltype, nodataaval=NULL
2. rast, VARIADIC reclassargset
3. rast, reclassexpr, pixeltype

ST_Union Returns the union of a set of raster tiles into a single raster composed of 1 or more bands.

1. rast agg
2. rast, unionargset agg
3. rast, nband agg
4. rast, uniontype agg
5. rast, nband, uniontype agg

Built-in Map Algebra Callback Functions

ST_Distinct4ma Raster processing function that calculates the number of unique pixel values in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_InvDistWeight4ma (value, pos, VARIADIC userargs) Raster processing function that interpolates a pixel's value from the pixel's neighborhood.

ST_Max4ma Raster processing function that calculates the maximum pixel value in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_Mean4ma Raster processing function that calculates the mean pixel value in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_Min4ma Raster processing function that calculates the minimum pixel value in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_MinDist4ma (value, pos, VARIADIC userargs) Raster processing function that returns the minimum distance (in number of pixels) between the pixel of interest and a neighboring pixel with value.

ST_Range4ma Raster processing function that calculates the range of pixel values in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_StdDev4ma Raster processing function that calculates the standard deviation of pixel values in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

ST_Sum4ma Raster processing function that calculates the sum of all pixel values in a neighborhood.

1. matrix, nodatamode, VARIADIC args
2. value, pos, VARIADIC userargs

Raster Processing: DEM (Elevation)

ST_Aspect Returns the aspect (in degrees by default) of an elevation raster band. Useful for analyzing terrain.

1. rast, band=1, pixeltype=32BF, units=DEGREES, interpolate_nodata=FALSE
2. rast, band, customextent, pixeltype=32BF, units=DEGREES, interpolate_nodata=FALSE

ST_HillShade Returns the hypothetical illumination of an elevation raster band using provided azimuth, altitude, brightness and scale inputs.

1. rast, band=1, pixeltype=32BF, azimuth=315, altitude=45, max_bright=255, scale=1.0, interpolate_nodata=FALSE
2. rast, band, customextent, pixeltype=32BF, azimuth=315, altitude=45, max_bright=255, scale=1.0, interpolate_nodata=FALSE

ST_Roughness (rast, nband, customextent, pixeltype="32BF", interpolate_nodata=FALSE) Returns a raster with the calculated "roughness" of a DEM.

ST_Slope Returns the slope (in degrees by default) of an elevation raster band. Useful for analyzing terrain.

1. rast, nband=1, pixeltype=32BF, units=DEGREES, scale=1.0, interpolate_nodata=FALSE
2. rast, nband, customextent, pixeltype=32BF, units=DEGREES, scale=1.0, interpolate_nodata=FALSE

ST_TPI (rast, nband, customextent, pixeltype="32BF", interpolate_nodata=FALSE) Returns a raster with the calculated Topographic Position Index.

ST_TRI (rast, nband, customextent, pixeltype="32BF", interpolate_nodata=FALSE) Returns a raster with the calculated Terrain Ruggedness Index.

Raster Processing: Raster to Geometry

Box3D (rast) Returns the box 3d representation of the enclosing box of the raster.

ST_ConvexHull (rast) Return the convex hull geometry of the raster including pixel values equal to BandNoDataValue. For regular shaped and non-skewed rasters, this gives the same result as ST_Envelope so only useful for irregularly shaped or skewed rasters.

ST_DumpAsPolygons (rast, band_num=1, exclude_nodata_value=TRUE) Returns a set of geomval (geom,val) rows, from a given raster band. If no band number is specified, band num defaults to 1.

ST_Envelope (rast) Returns the polygon representation of the extent of the raster.

ST_MinConvexHull (rast, nband=NULL) Return the convex hull geometry of the raster excluding NODATA pixels.

ST_Polygon (rast, band_num=1) Returns a multipolygon geometry formed by the union of pixels that have a pixel value that is not no data value. If no band number is specified, band num defaults to 1.

Raster Operators

&& Returns TRUE if A's bounding box intersects B's bounding box.

1. A, B
2. A, B
3. B, A

&< (A, B) Returns TRUE if A's bounding box is to the left of B's.

&> (A, B) Returns TRUE if A's bounding box is to the right of B's.

= (A, B) Returns TRUE if A's bounding box is the same as B's. Uses double precision bounding box.

@ Returns TRUE if A's bounding box is contained by B's. Uses double precision bounding box.

1. A, B
2. A, B
3. B, A

~= (A, B) Returns TRUE if A's bounding box is the same as B's.

~ Returns TRUE if A's bounding box contains B's. Uses double precision bounding box.

1. A, B
2. A, B
3. B, A

Raster and Raster Band Spatial Relationships

ST_Contains Return true if no points of raster `rastB` lie in the exterior of raster `rastA` and at least one point of the interior of `rastB` lies in the interior of `rastA`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_ContainsProperly Return true if `rastB` intersects the interior of `rastA` but not the boundary or exterior of `rastA`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_Covers Return true if no points of raster `rastB` lie outside raster `rastA`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_CoveredBy Return true if no points of raster `rastA` lie outside raster `rastB`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_Disjoint Return true if raster `rastA` does not spatially intersect `rastB`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_Intersects Return true if raster `rastA` spatially intersects raster `rastB`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`
3. `rast, nband, geommin`
4. `rast, geommin, nband=NULL`
5. `geommin, rast, nband=NULL`

ST_Overlaps Return true if raster `rastA` and `rastB` intersect but one does not completely contain the other.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_Touches Return true if raster `rastA` and `rastB` have at least one point in common but their interiors do not intersect.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_SameAlignment Returns true if rasters have same skew, scale, spatial ref, and offset (pixels can be put on same grid without cutting into pixels) and false if they don't with notice detailing issue.

1. `rastA, rastB`
2. `ulx1, uly1, scalex1, scaley1, skewx1, skewy1, ulx2, uly2, scalex2, scaley2, skewx2, skewy2`
3. `rastfield agg`

ST_NotSameAlignmentReason (`rastA, rastB`) Returns text stating if rasters are aligned and if not aligned, a reason why.

ST_Within Return true if no points of raster `rastA` lie in the exterior of raster `rastB` and at least one point of the interior of `rastA` lies in the interior of `rastB`.

1. `rastA, nbandA, rastB, nbandB`
2. `rastA, rastB`

ST_DWithin Return true if rasters `rastA` and `rastB` are within the specified distance of each other.

1. `rastA, nbandA, rastB, nbandB, distance_of_srid`
2. `rastA, rastB, distance_of_srid`

ST_DFullyWithin Return true if rasters rastA and rastB are fully within the specified distance of each other.

1. rastA, nbandA, rastB, nbandB, distance_of_srid
2. rastA, rastB, distance_of_srid

Raster Tips