

# Geoserver user manual

This document describes how to access the Austrian Data Cube (ACube) through WMS/WCS Geoserver with QGIS. To run this application, you will need QGIS version 3.8 or higher and a stable internet connection.

In case you have not installed QGIS or have an older version please visit <u>https://qgis.org/en/site/</u> to install or update the software. QGIS is a community driven open source and free geographic information system with many of the capabilities of commercial GIS.

After opening QGIS, click on the **Open Data Source Manager** button in QGIS. This button will be commonly found at the upper left corner (red box figure below). This action will prompt a window.



Next, you will need to choose between "**WMS/WMTS**" or "**WCS**", see red box in the image below. WMS will provide a georeferenced image including previews and styles and WCS will display raw data values, more information about this can be found at the ACube wiki (https://austriandatacube.eodc.eu/xwiki/). The following instructions are identical for both services.

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	Coordinate Reference System:	Change
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	Ready	Add Help







Click on the button New in the main part of the window to add a New service (see red box figure below).

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	Browser	Layers	
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A "Create a New WCS/WMS Connection" window will appear (see figure). Fill out the following information:

- **Connection Details:** •
  - Name: Choose a name for the connection
  - URL: 0

https://geoserver.eodc.eu/geoserver/ows

- Authentication: •
  - To setup a new authentication: click on the + icon (red box)

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Earth Observation Data Center for Water Resources Monitoring





A new Authentication window will open. IMPORTANT: YOU WILL BE PROMPTED FOR A PASSWORD/KEYRING. IN THIS STEP IT IS IMPORTANT TO SECURE YOUR INFORMATION. QGIS WILL SAVE YOUR DATA ON YOUR DISK IN AN ENCRYPTED DATABASE GIVEN THE PROVIDED PASSWORD. **REMEMBER THE PASSWORD AFTER SAVING.** 

The window must be filled with following information (see figure below):

- Name: name for the authentication •
- Id: will be generated automatically •
- Type of authentication shall be set to OAuth2 authentication from the dropdown (this will add new fields to the window)
- Grant Flow: Resource Owner •
- Token URL: https://bouncer.eodc.eu/auth/realms/EODC/protocol/openid-connect/token
- **Client ID: geoserver** •
- Username: your EODC username/email •
- Password: your EODC password •

ଭ		Authentication				×		
Name	EODC A	UTH	Id	8t	c48i9			
Resource	Optional	URL resource						
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Grant Fl	ow Reso	purce Owner		,	-	Ŀ		
Descript	ion							
Token U	RL	https://bouncer.eodc.eu/auth/realms/EODC/protocol/openid	conn	ect/tok	en			
Refresh	Token UR	Optional						
Client ID	)	geoserver						
Client Se	ecret	Optional	Optional 💿					
Usernam	ne	username						
Passwor	ď	•••••			3	•		
Scope		Optional (space delimiter)						
API Key		Optional						
		Advanced						
Token Se	ession	Persist between launches						
Access N	/lethod	Header	Header 🔻					
Request Timeout		30 seconds 🌩						
						•		
Extra	initial red	quest parameters						
		Note: Saving writes directly to authentication database						
Reset			Sav	ve	Ca	ncel		



💳 Bundesministerium Nachhaltigkeit und Tourismus Landesverteidigung





Click **Save** to store this information and make sure it is selected in the following window. Click **OK** to save the server. You may re-use the stored authentication information for another OWS service. Simply select the name of the service from the dropdown when defining a new EODC Connection.

ର	Create a New WCS Connection	×				
Connectio	on Details					
Name EODC Geoserver						
URL	https://geoserver.eodc.eu/geoserver/ows					
Authent	tication					
Conf	figurations Basic					
Choo	ose or create an authentication configuration					
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Confi	igurations store encrypted credentials in the QGIS					
autre	encication database.					
WCS Op	ptions					
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Inv	vert axis orientation					
Sm	nooth pixmap transform					
	OK Cancel Help					







Click Connect to connect to the resource server. A list of available datasets will be shown (see figure below), including ID, Name, Title and Abstract. Select a dataset, configure other inputs such as time, CRS or other information and click Add to add the data to QGIS as a layer.

Q				Data Source Manager   Br	rowser   WCS			e 👂
	Browser							
		Layers						
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		EODC	Geoserver					
	Raster	Con	nect <u>N</u> ew	Edit Remove		Load	Save	
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9	Delimited Text	7	acube:MFCOV	BOKU Monthly aggregate fraction of vegetation cov	Generated from ImageMosaic			
1	Deutificed Text	8	acube:SCL	BOKU Scene Classification Layer	Generated from ImageMosaic			
35	GeoBackage	9	acube:TCI	BOKU True Color Image	Generated from ImageMosaic			
V+	GeoFackage	10	acube:B02	BOKU_B02	Generated from ImageMosaic			
10	discription for	11	acube:B03	BOKU_B03	Generated from ImageMosaic			
<b>_</b> •	SpatiaLite	12	acube:B04	BOKU_B04	Generated from ImageMosaic			
632		13	acube:B05	BOKU_B05	Generated from ImageMosaic			
· · ·	PostgreSQL	14	acube:B06	BOKU_BOG	Generated from ImageMosaic			
The		15	acube:B07	BOKU_BOZ	Generated from ImageMosaic			
ייע	MSSQL	10	acube:B08	BOKU_BUS	Generated from ImageMosaic			
		19	acube:B12	BOKU_BII	Generated from ImageMosaic			
DB2	DB2	19	acube:B8A	BOKU BRA	Generated from ImageNosaic			
		20	acube:MB02	BOKU MB02	Generated from ImageMosaic			
V	Virtual Layer	21	acube:MB03	BOKU_MB03	Generated from ImageMosaic			
		22	acube:MB04	BOKU_MB04	Generated from ImageMosaic			
391	WMS/WMTS	23	acube:MB05	BOKU_MB05	Generated from ImageMosaic			
		24	acube:MB06	BOKU_MB06	Generated from ImageMosaic			
	wcs	25	acube:MB07	BOKU_MB07	Generated from ImageMosaic			
-		26	acube:MB08	BOKU_MB08	Generated from ImageMosaic			
67	WFS	27	acube:MB11	BOKU_MB11	Generated from ImageMosaic			
		28	acube:MB12	BOKU_MB12	Generated from ImageMosaic			
1	ArcGIS Map Server	29	acube:MB8A	BOKU_MB8A	Generated from ImageMosaic			- 11
24		21	copernicus.eu:	EUDEM Hillshade	Generated from GeoTIFE	(		-
	ArcGIS Feature Server	32	acube:MMEN	TUW Monthly Aggregate GMR	Generated from BraneMosaic			
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Optional: You may be prompted to select a **transformation**.

Q Select Transformation for copernicus.eu:eu_dem_v11							
Multiple operations are possible for converting coordinates between these two Coordinate Reference Systems. Please select the appropriate conversion operation, given the desired area of use, origins of your data, and any other constraints which may alter the "fit for purpose" for particular transformation operations.							
Source CRS EPSG:3035 - ETRS89-extended / LAEA Europe							
Destination CRS EPSG:4326 - WGS 84							
Transformation	Accuracy (meters)	Area of Use					
1 Inverse of Europe Equal Area 2001 + ETRS89 to WGS 84 (1)	1	Europe - LCC & LAEA, Europe - ETRS89					
2 Inverse of Europe Equal Area 2001 + Ballpark geographic offset from ETRS89 to WGS 84	Unknown	Europe - LCC & LAEA, World					
Inverse of Europe Equal Area 2001 + ETRS89 to WGS 84 (1)							
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Area of use: Europe - LCC & LAEA, Europe - ETRS89		A CAR					
Identifiers: INVERSE(EPSG):19986, EPSG:1149	Identifiers: INVERSE(EPSG):19986, EPSG:1149						
+proj=pipeline +step +inv +proj=laea +lat_0=52 +lon_0=10 +x_0=4321000 +y_0=3210000 +ellps=GRS80 +step +proj=unitconvert +xy_in=rad +xy_out=deg							
		Make default					
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The dataset is then loaded (see figure below), and may be manipulated (downloaded, processed into another layer etc.) as a standard QGIS layer.



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The previous example shows how to load temporal WCS datasets to work with, further process, download etc. The next example will show how to efficiently visualize datasets using the **Time Manager plugin**. The Time Manager plugin is available in the standard QGIS plugin store. To access the store click: Plugins -> Manage and Install Plugins. Search for TimeManager. Click on Install Plugin



The plugin should install, and it should be immediately added to the screen. It is recommended to restart QGIS after installing new plugins.





Geoserver user manual		AUSTRIAN DATA CUBE
Time Manager          Image: Settings       Export Video       Time frame start       2000-01-01 00:00:00.000       Time frame size       1       *	20	
ee □ ▶ not set	not set	

To explore WMS with the plugin, first add a WMS dataset.

Q				Data Source Manager   WMS/WMTS		×
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٩,	Raster	Connect	<u>N</u> ew Edit	Remove		Load Save Add Default Servers
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2	Delimited Text	* 1		Austrian data cube Sentinel-1	Austrian dat Products cre	Map Service (acube, Contains high level data derived from Sentinel-1 and Sentinel-2 missions, acted from Sentinel-1 imagery by TU.
4	GeoPackage	▼ 36	37 acube:CLOUDMASK	Sentinel-2 BOKU Cloudmask	Products cre This dataset	eated from Sentinel-2 imagery by BOKU. contains a binary map (Mask) of cloud and buffered cloud shadows. The product is resampled t
1	SpatiaLite		39 acube:FAPAR 45 acube:MFAPAR	BOKU Fraction of absorbed photosynthetically active radiation BOKU Monthly aggregate fraction of absorbed photosynthetically _ DOVU Monthly aggregate fraction of superbine restrictions of the second	This dataset This dataset	contains the fraction of absorbed photosynthetically active radiation (FAPAR) layer. The produ contains the fraction of absorbed photosynthetically active radiation (FAPAR) layer obtained fr
q.	PostgreSQL		57 acube:MLAI 52 acube:MLAI	BOKU Monthly Aggregate Leaf Area Index BOKU Monthly Aggregate Leaf Area Index	This dataset This dataset	contains the traction of vegetation cover (nCOVER) layer obtained from Sentine-2A and 2B data. : contains the Leaf Area Index (LAI) layer obtained from Sentinel-2A and 2B data, temporally ag_ : contains the Leaf Area Index (LAI) layer obtained from Sentinel-2A and 2B data, temporally ag_
)))	MSSQL	2	67 acube:MTCI 69 acube:SCL	BOKU Monthly True Color Image BOKU Scene Classification Layer	This dataset This dataset	contains the True Color Image obtained from Sentinel-2A and 2B data, temporally aggregated contains the scene classification (SCL) layer, output of the ESA Sen2Cor algorithm. The produc
D82	DB2		acube:raster_scl raster	A raster style for SCL A boring default style	A sample st	yle for rasters
V	Virtual Layer 1		72 acube:B 78 acube:MB 24 acube:TC	BOKU Atmospherically corrected bands BOKU Monhly aggregate atmoshperically corrected bands	This dataset This dataset	contains atmospherically-corrected Sentinel-2A and 2B data processed using the European S contains the atmospherically-corrected Sentinel-2A and 2B data, temporally aggregated over contains the Tous College transport (COL) exclusion as the combinations of the Constant 2 and (COL)
	WMS/WMTS		87 acube:LAI 92 acube:FCOVER	BOKU Leaf Area Index BOKU Fraction of vegetation cover	This dataset This dataset	contains the Frue color image (FLI), obtained as the combination of the Sentine 2 real (804), : contains the Leaf Area Index (LAI) layer. The crop's LAI is an important structural variable with : contains the fraction of vegetation cover (FCOVER) layer. The product is resampled to the Equi
\$	wcs	▶ 97 ▶ 107		SuLAMoSA copernicus.eu	Contains pro Contains pro	oducts from the SuLAMoSA project. oducts from the copernicus.eu project.
	WFS	Image Encodin	g			
87	ArcGIS Map Server	● PNG ○	PNG8 O JPEG O GIF O	) TIFF () SVG		
6.	ArcGIS Feature Server	Coordinate Re	ference System (5 available)			4
놂	GeoNode	Tile size	256			256
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		WGS 84 / U	FM zone 33N		5	Change
		Use conte	extual WMS Legend			
			6			
		Layer name BOR	(ป_รณ์			
		1 Layer(s) selecte	d			
						Close <u>A</u> dd Help

- 1. Select WMS dataset in dataset source manager
- 2. Select the EODC Geoserver
- 3. Select the desired dataset. **NOTE:** Some datasets have multiple WMS styles associated with them. In this case the scene classification layer has a default raster style and a custom classification style.
- 4. **Optional**: For faster rendering set these fields to 256x256. This allows faster requests to the server but might cause block artifacts.
- 5. Select the desired coordinate reference system

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6. **Optional**: Give the layer a name

Click Add when you have selected these options and the dataset will load. The layer browser will show the style associated with the layer.







Projec	t Bdit Yiew Layer Settings Plugins Vector	Ranter Database Web Mesh Programs Help				
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To view the dataset temporally we use the Time Manager plugin shown pinned to the bottom of the QGIS window. Clicking on Settings will reveal further options on how to render the dataset with the plugin.

🔇 Tim	ettings		
Layers		Time Menerer	-
Layer name Start End (optional) Enabled Index Time format Offset Inte			
	Add raster	Time Manager filters your layers and displays only layers and features that match the specified time frame. Time Manager supports vector	
	Remove layer	layers and raster layers (including WMS with TIME dimension).	
		Timestamps have to be in one of the following formats:	
		• %Y-%m-%d %H:%M:%S.%f	
		• %Y-%m-%d %H:%M:%S	
		<ul> <li>%Y-%m-%d %H:%M</li> </ul>	
		<ul> <li>%Y-%m-%dT%H:%M:%S</li> </ul>	
4 b		%Y-%m-%dT%H:%M:%SZ	
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Animation options		<ul> <li>%Y-%m-%dT%H:%MZ</li> </ul>	
Show frame for 500 🗘 milliseconds		<ul> <li>%Y - %m - %d</li> </ul>	
		• %Y/%m/%d %H:%M:%S.%f	
Play animation backwards		• %Y/%m/%d %H:%M:%S	
Looping animation		• %Y/%m/%d %H:%M	
Ecoping animation		• %Y/%m/%d	
Do not export empty frames in time managed layers		• %H:%M:%S	
		• %H:%M:%S.%f	
✓ Display frame start time on map Time display options		• %Y.%m.%d %H:%M:%S.%f	Ŧ
		OK Cancel	

By Clicking on add Raster we can add a raster to be visualized with the plugin. NOTE: Specifying both Start time and End time is recommended (i.e. start: 2017-07-01 end: 2019-07-30). Click on OK and OK in the time manager settings. A timestamp should be shown in the bottom right of the map display window.







<b>Q</b>	Select layer and column(s)	×
Layer	BOKU_SCL	
End time	2019-07-01	(optional)
	Start of date in name	End of date in name
Get start from name	0	0
Get end from name	0	0
Offset (in sec)	0	(optional)
Layer is netCDF file w	ith time dimension	
		Cancel

To control the date, we use the following options:

- 1. Shows the current datetime of the dataset. This option may be controlled manually.
- 2. Shows the timeframe after the given datetime to show dataset. This may be larger than 24 hours, but it also may show 2 datasets simultaneously. Setting to 23 will show only the data for the given date.
- 3. Will advance the date on the date timeline by the **TILE FRAME SIZE** (in this case 23 hours). This may be useful for creating animations.





