IMOS Integrated Marine Observing System

Australian Ocean Data Network (AODN)

Satellite Remote Sensing – Ocean Colour Gridded WORKFLOW

Version 1.0

3rd February 2025

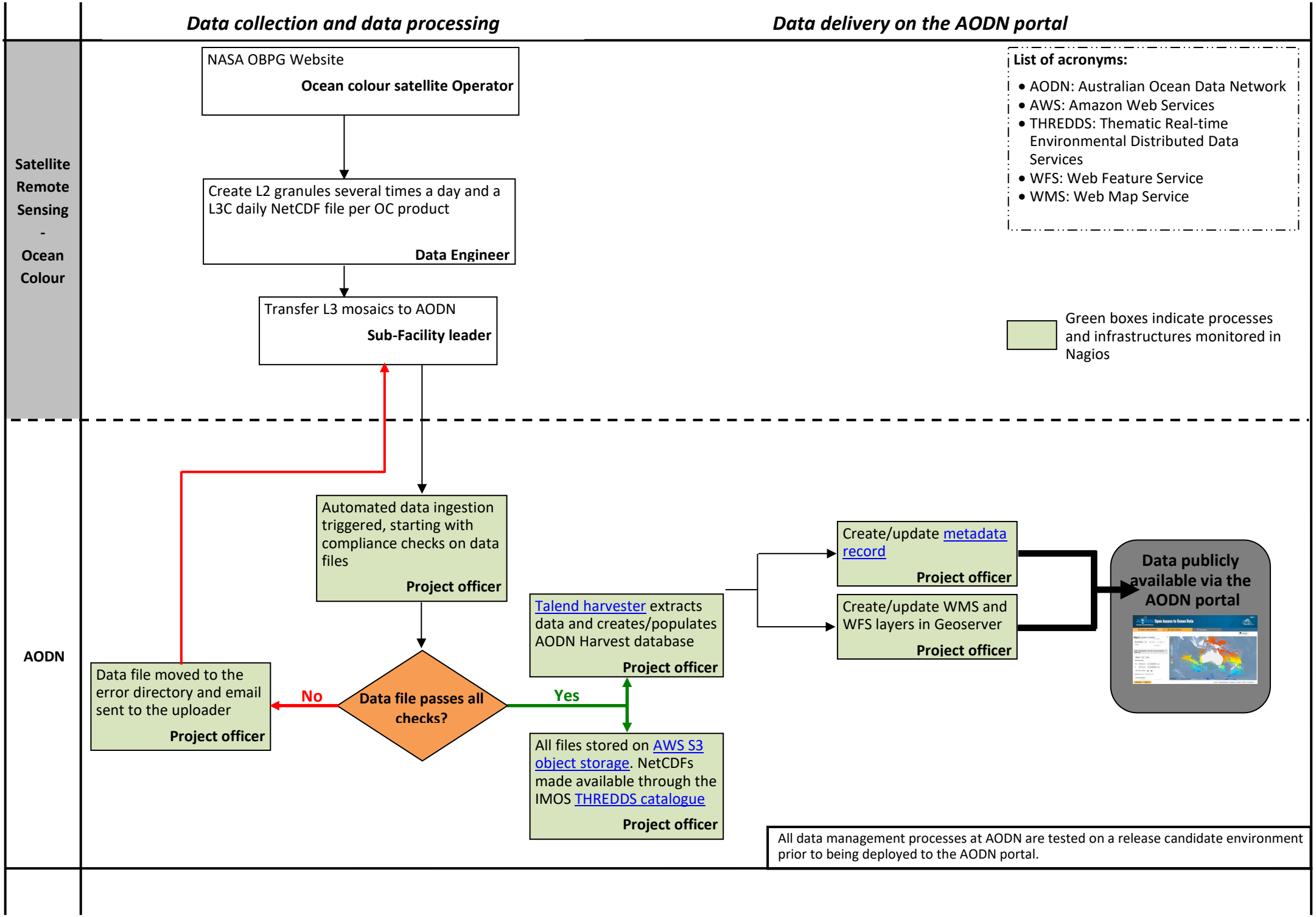
Data Workflows

The AODN, in managing the data for IMOS, has developed workflows for each IMOS facility to describe the flow of data from planning through data collection to data delivery and public data access.

The primary goals of these workflows are to:

- Improve data flow and data handoff, making tracking of data status easy and preventing data loss.
- Identify and delimit precisely the responsibilities of each person involved.
- Improve communication at the interface between IMOS facilities and the AODN.
- Improve transparency for end users by providing more details to populate metadata records (*i.e.* limitations and processing methods applied to datasets).
- Assist in reporting planned deployments against actual deployments and data delivery.

The workflow is available on the next page of this document. Additional information (*i.e.* timeline, input, output, step description) for each operation step is available in the 'Supporting Information' section. The role and contact details of people involved in the workflow are summarised in a table and suggested potential improvements are listed at the end of the document.


Data collection and data processing
Data delivery on the AODN portal
Satellite Remote Sensing - Ocean Colour
AODN
NASA OBPG Website
Ocean colour satellite Operator
Create L2 granules several times a day and a L3C daily NetCDF file per OC product
Data Engineer
Transfer L3 mosaics to AODN
Sub-Facility leader
List of acronyms:
• AODN: Australian Ocean Data Network
• AWS: Amazon Web Services
• THREDDS: Thematic Real-time Environmental Distributed Data Services
• WFS: Web Feature Service
• WMS: Web Map Service
Green boxes indicate processes and infrastructures monitored in Nagios
Automated data ingestion triggered, starting with compliance checks on data files
Project officer
Data file passes all checks?
No
Data file moved to the error directory and email sent to the uploader
Project officer
Yes
Talend harvester extracts data and creates/populates AODN Harvest database
Project officer
All files stored on AWS S3 object storage. NetCDFs made available through the IMOS THREDDS catalogue
Project officer
Create/update metadata record
Project officer
Create/update WMS and WFS layers in Geoserver
Project officer
Data publicly available via the AODN portal
All data management processes at AODN are tested on a release candidate environment prior to being deployed to the AODN portal.

Supporting information

Phase	Operation step	Timeline	Input	Output	Step description	Step operator
Data collection and processing	**NASA OBPG Website**	**Continuous**	Aqua/MODIS, SNPP/VIIRS NOAA-20/VIIRS NOAA-21/VIIRS Sensor data + Global met. Observations and analyses	Raw data received by ground stations. Ancillary data files, Calibration Lookup files	Global data are received from the US spacecraft by NASA and are compiled into uniformly labelled low level data files, each of 3-5mins duration, usually within 2-3 hours of acquisition. NASA also acquire global meteorological data sets (analyses of water vapour, ozone, aerosols, SST, sea-ice etc) that are used as inputs to the processing to L2. Some ancillary data is updated as it becomes available up to 3-6 days post-acquisition, superseding initial quick-delivery products. Limited L2 products are made available by NASA in near-real-time and these are updated days and weeks later as more refined ancillary data becomes available. NASA Ocean Biology Processing Group (OBPG) also track per-sensor calibration and periodically release lookup tables for use by the processing software.	**Ocean Colour satellite operator (External agencies)**
	Create L2 granules several times a day and a L3C daily NetCDF file per OC product	**Sub-daily to One day**	Raw data provided by NASA, together with Ancillary and Calibration files	• Day L2 granules for all sensors • Night time L2 SST granules for all sensors • Daytime L3C OC product NetCDF files created	- Download L0/L1A granules and ancillary (Met.) files several times daily. Check for and download calibration tables daily to weekly. The granule and ancillary data checks go back 3 weeks to identify when NASA have provided updates. - As soon as sufficient ancillary data is available, each granule is processed to L2, SST only for night time and OC +SST for day time. Whenever an updated granule or ancillary data is detected up to 3 weeks after initial acquisition, a granule will be reprocessed. - On a daily basis, the L2 granules for each day in the past 3 weeks are examined, and if any new ones are detected, an L3 daily mosaic is made for each OC product and transferred to the output archive.	**Satellite Remote Sensing Data Engineer**

	Transfer L3 mosaics to AODN	**4 times daily**	L3 Mosaics NetCDF files in operator long term store	Files delivered to AODN with suitable (agreed) naming conventions	- Any newly created L3 files with daily mosaic OC products are transferred to the AODN input directory. This step includes updating internal file metadata and renaming the file consistent with agreed standards	**Satellite Remote Sensing (Sub-Facility leader)**
	Automated data ingestion triggered, starting with compliance checks on data files	**Automatic**	Individual NetCDF files on the AODN incoming directory	Checks performed on content of the NetCDF files	The generic incoming handler is automatically triggered once a new NetCDF file is uploaded to the AODN SRS/Ocean Colour incoming directory. The following checks are performed: • Check if the NetCDF file is a valid SRS Ocean Colour file • Check if the NetCDF file is CF (Climate and Forecast) compliant. If any of the above checks fail, the NetCDF file is moved to the error directory and an email is sent to the uploader. If it passes all checks, the tasks below are performed.	**AODN Project officer**
	All files stored on AWS S3 object storage. NetCDFs made available through the IMOS THREDDS catalogue		NetCDF files having passed all checks	NetCDF files stored on AWS S3 object storage and publicly available. NetCDFs also made available through the IMOS THREDDS catalogue	If NetCDF files are valid, all data files are then copied to the AWS S3 object storage. All files are then publicly available. NetCDFs are also made available on the IMOS THREDDS catalogue.	**AODN Project officer**
	Talend harvester extracts data and creates/populates AODN Harvest database		NetCDF files stored on AWS S3 object storage	All data is harvested in a AODN Harvest database	If files pass all checks, the generic timestep Talend harvester is then triggered. It extracts TIME values contained in NetCDF files and populate the tables and views used later on by the WMS/WFS services.	**AODN Project officer**
	Create/update WMS and WFS layers in Geoserver	**Automatic update**	Populated AODN Harvest database tables	WMS and WFS layers created in Geoserver	• Database tables and/or views are used to create a WMS and WFS layer in Geoserver. • Configure the pop-up window (content.ftl) and filters. • Create style for WMS visualisation.	**AODN Project officer**

Data delivery on the AODN portal	**Create/update metadata record**		Populated AODN Harvest database tables	Geonetwork record created and configured to support data discovery, visualisation and download via the AODN portal	• Create a metadata record with a new UUID. • Configure the newly created record (*e.g.* abstract, point of contact, parameters, timeframe). • Fill out the distribution section with links to the corresponding Geoserver WMS and WFS layers and other AODN's download services. • Talend harvester automatically updates bounding box.	**AODN Project officer**

Contact details (as at February 2025)

	Role	Name	Email address	Phone number
Satellite Remote Sensing - Ocean Colour	**Sub-Facility leader (Remote Sensing)**	Edward King	edward.king@csiro.au	(03) 6232 5334
	Sub-Facility Leader (Ocean Colour)	Thomas Schroeder	Thomas.schroeder@csiro.au	
	Data Engineer	Roger Scott		
AODN	**Project officer**	Laurent Besnard	Laurent.Besnard@utas.edu.au	(03) 6226 8570
	Data services team leader	Benedicte Pasquer	Benedicte.Pasquer@utas.edu.au	(03) 6226 1927

Supporting links

NASA Oceandata portal: https://oceandata.sci.gsfc.nasa.gov/directdataaccess/

AODN portal: http://portal.aodn.org.au

AODN portal help page: https://help.aodn.org.au/
Data upload instructions: https://help.aodn.org.au/aodn-ftp-upload/ (contact AODN for access)

Example Satellite Remote Sensing Ocean Colour layer on AODN portal: https://portal.aodn.org.au/search?uuid=d7a14921-8f3f-4522-9a54-e7d1df969c8a
Example Satellite Remote Sensing Ocean Colour metadata record: https://catalogue-imos.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=d7a14921-8f3f-4522-9a54-e7d1df969c8a

Satellite Remote Sensing Ocean Colour data on S3 server: https://data.aodn.org.au/?prefix=IMOS/SRS/OC/gridded/
Satellite Remote Sensing Ocean Colour THREDDS server: https://thredds.aodn.org.au/thredds/catalog/IMOS/SRS/OC/gridded/catalog.html

IMOS user code library: https://github.com/aodn/imos-user-code-library
Satellite Remote Sensing Ocean Colour pipeline scripts on GitHub: https://github.com/aodn/python-aodndata/blob/master/aodndata/srs/srs_oc_gridded.py

IMOS website: http://www.imos.org.au/

Satellite Remote Sensing Ocean Colour sub-facility: https://imos.org.au/facility/satellite-remote-sensing/ocean-colour