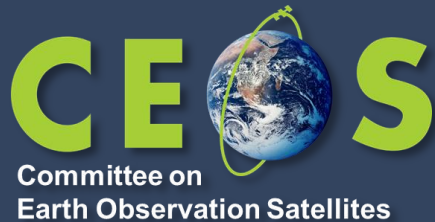


Interoperability Demonstrator: Shoreline Decision Ready Data



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Shoreline Processing Overview



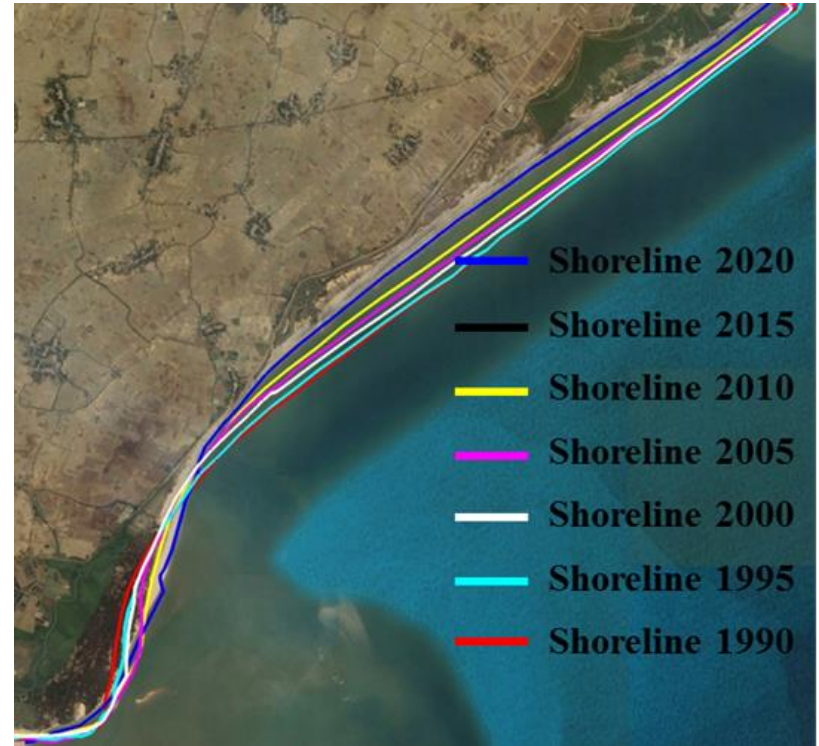
- ❖ Satellite observations constitute the primary input dataset.
- ❖ The shoreline critically depends on the tidal window of satellite observations
- ❖ Depends on the coastal geomorphology of the region
- ❖ Use of indices (MNDWI) to identify the shoreline positions
- ❖ Seasonal/yearly data to understand the changes
- ❖ Coastal erosion and accretion



Shoreline and Dynamics



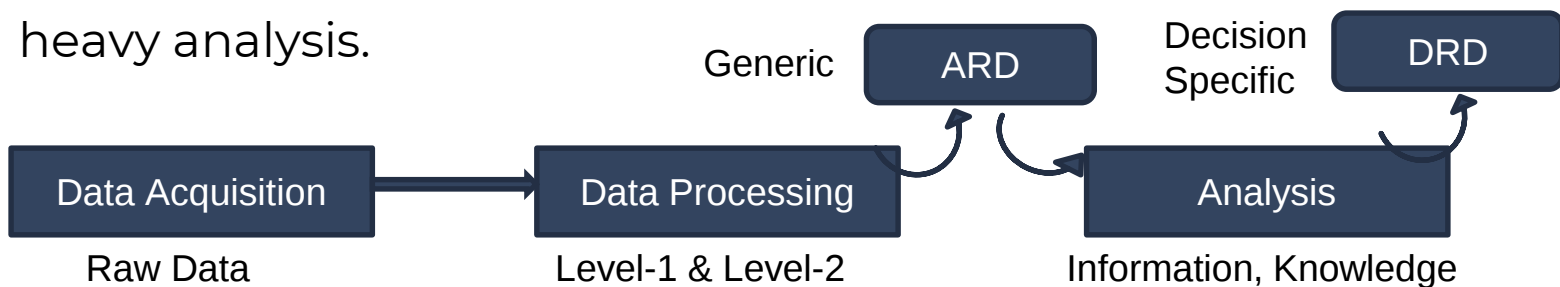
**Shoreline changes at Chilika and Penthra
(Odisha, East coast of India)**



- ❖ Interoperability of Shorelines generated from different agencies
- ❖ No Consistent formats and metadata
- ❖ Unavailability of ancillary and quality meta data
- ❖ Difficulty for Stakeholders in handling different data
- ❖ Discovery and Access of Shoreline products
- ❖ To overcome these limitations we propose Shoreline Decision Ready Data (DRD)

❖ What is Decision Ready Data (DRD) ?

- **Decision-ready data** is data that has already been cleaned, processed, and structured so it can be used **directly to support decision-making**, without requiring extra transformation or heavy analysis.



- ❖ Develop Shoreline DRD Product Specifications
- ❖ Generate Shoreline DRD products from different missions and demonstrate Interoperability
- ❖ Interactions with stakeholders and data providers for compliance to Shoreline DRD Product Specifications (COAST-VC)

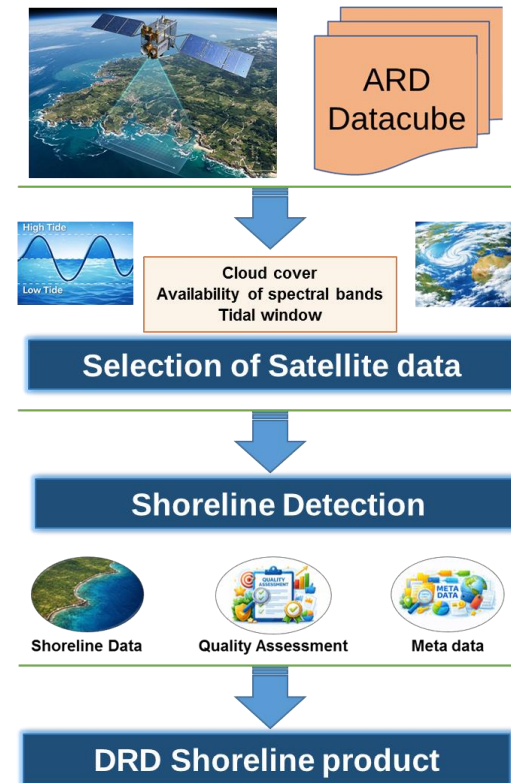
Importance of Shoreline DRD Products

- ❖ Reliable shoreline products support stakeholders, coastal zone managers, and academic institutions to identify the region where the critical shoreline changes are taking place.
- ❖ Standardized DRD specifications ensure interoperability across satellite missions.
- ❖ Well-defined metadata and quality indicators improve usability for scientific and operational applications.

Shoreline DRD Product



- ❖ The shoreline is a geospatial product that represent the land-water boundary of the coastal region.
- ❖ Transform satellite observations into standardized geospatial layers that can be directly used for operational decision making.
- ❖ The specification ensures consistent metadata, quality indicators, and traceability across datasets derived from different satellite missions.
- ❖ The product framework supports stakeholders, coastal zone managers, and academic institutions to identify the region where the critical shoreline changes are taking place.



- ❖ Title: Shoreline (xxxx-DRD-SL).
- ❖ The DRD Shoreline product specifications will define
 - Product Format and contents
 - Metadata
 - Quality and uncertainty
 - Validation and Inter-comparison
 - Discovery and Accessibility.

Product Format

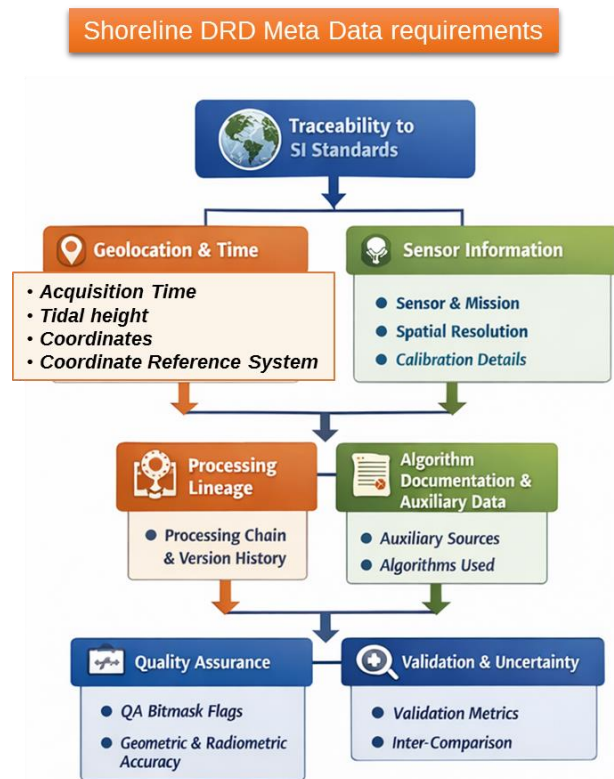
Geospatial feature class (shp files or Geojson)

Selection of Satellite Data

Data Level (Level 2)

- Cloud cover
 - Availability of spectral bands (for indices)
 - Georeferencing
 - Tidal window
-

- ❖ Metadata provides structured information describing the dataset, enabling discovery, traceability, and usability.
- ❖ DRD metadata must describe acquisition time, sensor characteristics, geolocation information, tidal height, and processing history.
- ❖ Machine-readable metadata enables automated workflows for data discovery, cataloging, and analysis.
- ❖ Recommended metadata standards include ISO-19115 and SpatioTemporal Asset Catalog (STAC).



Shoreline	SL
Satellite data	Detail of original satellite data used to generate the DRD product.
Instrument Ancillary Data	Time and Geographic information
Other Ancillary Data	Tidal timing specific to the location and time, Spatial information on location Coastal geomorphology (Mudflat, beach, cliff, etc)
Metadata	Year, date, time Location name Satellite data used Tidal height Coastal geomorphology

- ❖ The coordinate reference system used by the dataset must be explicitly specified.
- ❖ Projection parameters must allow transformation to global geodetic systems such as WGS84.
- ❖ Map projection information must allow integration with other geospatial datasets.





- ❖ Processing lineage must describe the sequence of transformations applied to satellite observations.
- ❖ Metadata should identify auxiliary datasets used during processing.
- ❖ Algorithm documentation or ATBD references must be provided.
- ❖ Software versions and processing environment should be traceable for reproducibility.

Quality and Uncertainty Information

- ❖ Quality indicators must allow users to assess reliability of the detected Shoreline
- ❖ Quality metrics must include cloud contamination in the source data.
- ❖ Uncertainty reporting may include classification confidence.
- ❖ Such information is essential for scientific analysis and operational applications.

- ❖ Validation should be performed using independent observations such as field measurements.
- ❖ Validation statistics must quantify classification accuracy of detected shoreline.
- ❖ Inter-comparison with other satellite derived shoreline products helps evaluate consistency.
- ❖ Accuracy metrics may include confusion matrices, overall accuracy, and agreement statistics.

- ❖ DRD datasets must be accessible through persistent DOI landing pages.
- ❖ Products should ideally be distributed through open access portals.
- ❖ Recommended geospatial formats include shapefiles or geojson
- ❖ Metadata catalogs should follow STAC or ISO-19115 standards to enable machine discoverability.

Thanks

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