

Forum for Operational Oceanography

What is Operational Oceanography?

Andreas Schiller (CSIRO), Boris Kelly-Gerreyn (BoM) and Tim Moltmann (IMOS)

What is Operational Oceanography?

No widely accepted definition of "Operational Oceanography"!

Working definition provided by European component of the Global Ocean Observing System (EuroGOOS):

"Operational Oceanography can be defined as the activity of systematic and long-term routine measurements of the seas and oceans and atmosphere, and their rapid interpretation and dissemination"



What is Operational Oceanography: a closer look

- OO is like weather forecasting for the ocean provides estimates of ocean variables (temperature, currents, ...) for past, present and future
- Systematic focus on sustained operational (QC, robust) ocean observing/short-range prediction/reanalyses
- Routine, fully supported production and delivery of services to user-defined level
- Covering global-to-coastal marine environments, and physical and biogeochemical properties (eventually ecosystems)
- Involves marine industries, service providers, government agencies, and R&D providers



Operational Oceanography is "young":



Elements of Operational Oceanography: Products and Benefits

ESSENTIAL MARINE VARIABLES



www.myocean.eu

Elements of Operational Oceanography: Observations

- Ocean observations available in near-real-time (minutes to days) from various national & international programs, in-situ and remotely sensed
- Run in an operational setting (e.g. BoM), and some areas maintained through research funding (e.g. IMOS)



Elements of Operational Oceanography: Nowcasts

Forum for Operationa Oceanography

Present estimates are called Nowcasts and provide "best" descriptions of the present state of the ocean



Elements of Operational Oceanography: Forecasts

Automatic Quality Control

Data Assimilation

- Forecasts: future estimates and updated continuously (~1-2 weeks ahead)
- Forecasts depend on availability of ocean observations, super-computer facilities; use computer models & mathematical techniques



Elements of Operational Oceanography: Hindcasts/Reanalyses

Hindcasts or Reanalyses provide "best estimate" descriptions of past states, and time series showing trends and changes

predictive ocean atmosphere model for australia



Elements of Operational Oceanography: Products and Services (I)

- Most Operational Oceanography systems are run at national weather centres (e.g. BoM)
- Often depend on coordinated efforts from multiple government & research organisations (e.g. BoM & CSIRO) in partnership with users (e.g. RAN)



P Tide locations P Supplementary locations

O 7 Tidal stream





Elements of Operational Oceanography: Products and Services (II)

AT&T

2:00 pm edt todav

Winds & waves

00 AM Mon F

00 PM Sun Et

State AM Gun F

6

Operational services also provided by metocean service industry to regulators (e.g. AMSA, NOPSEMA, ATSB) and industry





The high level structure of the Copernicus Marine Service



Operational Oceanography: Other Applications (Incomplete List)

- Safety of life at sea
- Search and rescue
- Security and protection of the marine environment
- Warnings about coastal floods, water quality, storm impacts, harmful algal blooms and contaminants
- Shipping: electronic charts, sea state conditions, optimum routing
- Ecosystems: prediction of primary productivity, ocean currents, ocean climate variability
- Oil spills and dredging
- Maritime operations



Operational Oceanography: Applications and Benefits (Examples)



Operational Oceanography is an International Effort

- Global Ocean Observing System (GOOS), Global Telecommunication System (GTS) WMO Information System (WIS)
- Global coordination of R&D efforts in support of operational oceanography (GODAE OceanView)
- Global coordination of standardisation and verification
 - WMO
 - IOC
 - JCOMM





- Operational Oceanography (OO) has a broad definition
- **Ø**00 is very young relative to weather forecasting
- **Ø** (Yet) OO has many products and applications and is growing
- **S** Key areas are **research**, **government**, **industry & services**
- **Ø** 00 is both a **national and international endeavour**
- **Ø** 00 benefits from **partnerships and collaboration**
- **Ø** 00 provides an array of **societal and economic benefits**

