



Ocean Observatories: Evolution and Future Directions

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O•cean Ob•serv•a•to•ry (oh-shuh'n uh'b-zur-vuh-tawr-ee)



- Complex, interdisciplinary set of observations
- Continuous presence of robotic, autonomous systems
- Broad range of temporal and spatial scales
- Free and timely access to data

















Ocean Observing Time Series Activities

188	84 Western Channe	el Biological Observations	- English Channel		1980Wes	tern Channel Observa	tory		
193	31 Continuous Plar	hkton Recorder Surveys -	North Sea and North A	tlantic					
		1948 Ocea	an Weather Station Mike	– N. Atlantic			20	10	$ \longrightarrow $
		1949 (CalCOFI Surveys – Sout	hern California Coast	e .				$ \longrightarrow$
		1949	Ocean Weather Station	Papa / Line P – N. Paci	ric				$ \longrightarrow $
	Hydrostation 5 – Bern	huda, western Atlantic	1954						
	Helgoland	d Road Time-Series Static	on – North Sea 1962	4067					\rightarrow
	D' 1. (D .)	Ocean Observing S	atellites – Global Ocear		4077				$ \longrightarrow $
	Pliot Res	search Moored Array in th	e Tropical Atlantic (PIRA	AIA) – Iropical Atlantic	; 1977 N) Tranical Desifie	1084			\rightarrow
			Tropical Atmosphere C	uda Atlantia Tima Sari	N) – Tropical Pacific	1304 Guro 1988			\rightarrow
			Delli	uda Atlantic Time Series (BATS) – N. Atlantic Gyre 1988					-
		Dumamian of	Hawa Atmoonhorio Fluxoo in	the Meditemeneous See (HOTS) – Central N. Pacific 1988					
		Dynamics of Occer Acquir	Atmospheric Fluxes in	the Mediterranean Sea	(DTFAMED) - Ligurian	Sea 1900			\rightarrow
		Ocean Acquis	ation System for Interal	Sciplinary Science (OA	ool Dioin(DAD Site)	Atlantia 1989			\rightarrow
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		-			Clobal Dr	oject – Calibbean Sea	a) Clabel 2000		-
Start Start					Giobal Pro	Shiing Float Array (Arg	0) - Global 2000		-
	Arrest Const	A CONTRACTOR	B. Alad	N	irish t Adlanti	Sea Coastal Observato	ry – Irish Sea 2001		-
	•	1 10 10	A	N	orthwest Tropical Atlant	IC Station (NIAS) - Iro	pical Atlantic 2001		
1						Control Imminger	V – N. Atlantic 2001	•	-
12 A						E2 M3A Advistic Soc	Sea – N. Atlantic 2002 Moditorranoan 2002		-
	A reserve the second	N Dig	A Andrews	Gulf of Oman Cabled Observatory- Gulf of Oman 2002					
		•••		Tropical Eastern North Atlantic Time Series Observatory (TENATSO) - Tropical E Atlantic 2006					
Integrated Occore Observat								2000	-
			San All	Integrated Ocean Observing System (IOOS) – 05 Coastal					-
All ha				Integrated Marine Observing System (IMOS) - Australia 2007					$ \longrightarrow $
Poseidon E1-M3A – Aegean Sea/ Mediterranean Sea 2007									
Monterrey Accelerated Research System (MARS) – Monterrey Bay, CA 2008								2008	
	9	The second second	•			Neptune Ca	anada – Juan De Fuca Ridg	je 2009	
	Oces	an SITES	Der	nse Ocean-floor Obser	vatory Network for Earth	hquakes and Tsunamis	(DONET) – NW Pacific Flo	oor 2010	
	0000					Tasm	nan Bay (TASCAM) – New 2	Zealand 2011	
						Ocean Observatories	Initiative (OOI) – US Coast	al & Global Arrays 🔽	2015
1930	1940	1950	1960	1970	1980	1990	2000	2010	202
							2000	1010	
			Ocean Scien	ces	0011			w	O ^{LSANOGRA}
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	Ocean Leadership				Oregon State	UNIVERSITY	UCSD	WASHINGTON	9, 4, 1930



Ocean Observatories Initiative (OOI)



Four high latitude sites

Ocean Station Papa (NW Pacific) Irminger Sea (North Atlantic) Argentine Basin Southern Ocean

Two coastal ocean networks

Endurance Array (Oregon & Washington) Pioneer Array (North Atlantic Bight)

Regional scale array

Axial Seamount (Juan De Fuca Plate) Fixed Moorings and Mobile Platforms

By The Numbers:

\$386M Construction Project (MREFC)
6 Regional Arrays
48 Instrument Types
764 Simultaneously Deployed Instruments
78 Data Products
25-30 Year Operational Lifetime









Rutgers









Emerging Relationships and Governance





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UCSD







Stephen Johnson, 2010, "Where Good Ideas Come From"





Authorship Trends in Oceanographic Journals





Authorship Trend Factors







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WASHINGTON

Future Ocean Observatories Trends

- Networked approaches
- International standards
- Quantity and complexity of observations will increase

Increased system autonomy



