United States Academic Research Fleet - 2024

Global Class
40 scientists, worldwide range


Atlantis


Roger Revelle


Thompson


Marcus Langseth

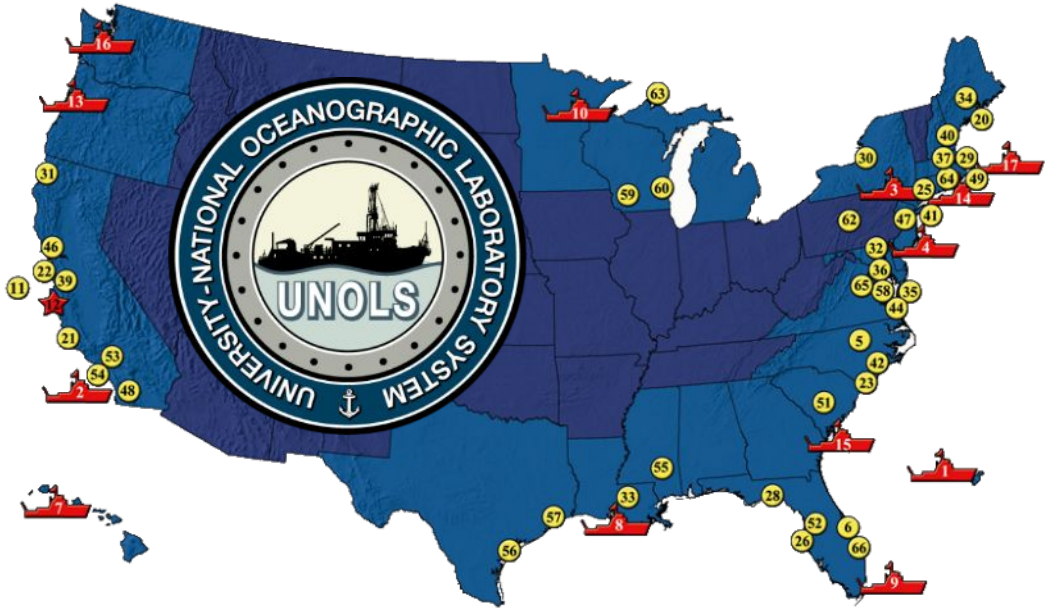

Sikuliaq

Ocean Class
24 scientists, oceanic range


Kilo Moana


Neil Armstrong


Sally Ride



Regional Class
20 scientists, continental shelf to abyssal plain


Endeavor


Atlantic Explorer


Hugh Sharp

Coastal Class
15 scientists, Coastal and local


Robert G. Sproul


Blue Heron


Rachel Carson


Savannah


Walton Smith


Pelican

Acknowledgments: We are grateful for support and collaboration

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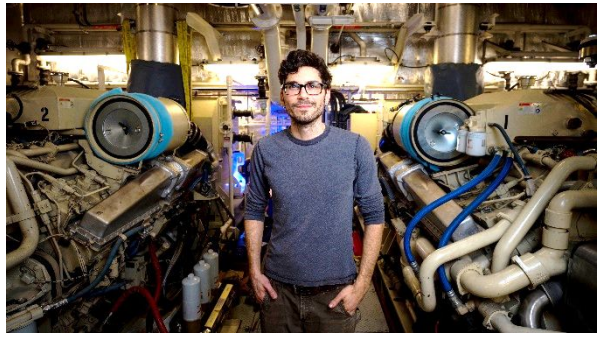
Zero-emission feasibility studies have been supported by the U.S Department of Transportation Maritime Administration (MARAD) Maritime Environmental and Technical Assistance (META) program.

Major funding for the zero-emission hydrogen hybrid Coastal Class Research Vessel has been provided by the State of California through SB 129, signed by Governor Gavin Newsom in 2021.

Mariners

Professional scientific mariners
USCG credentials required



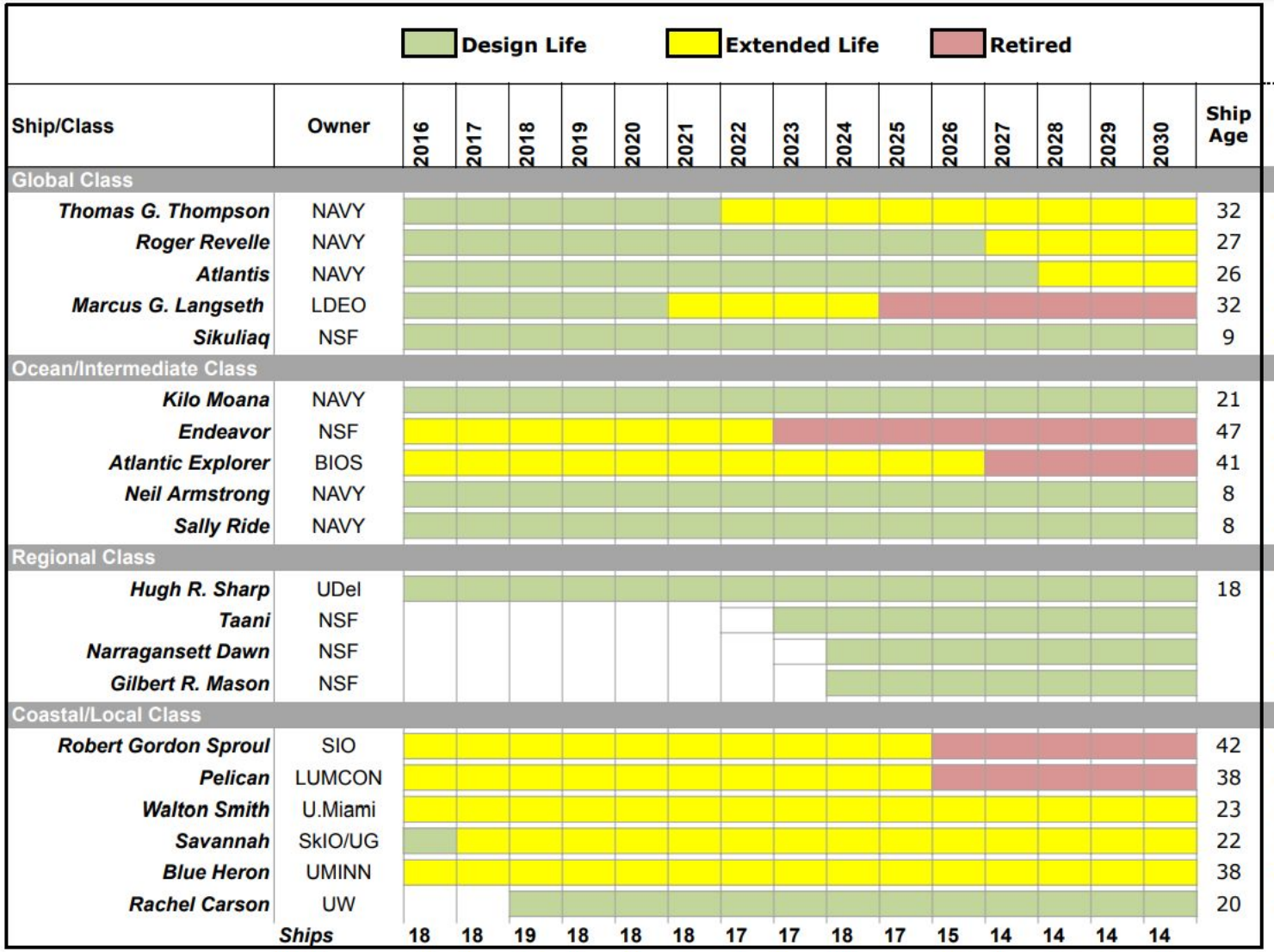
Marine Technicians

Experts in ocean instrumentation, deck operations, data acquisition and computing

Opportunity

Service lives of vessels in the U.S. Academic Research Fleet

*To every thing there is a season, and a time to every ship, upon the heaving**



Ship/Class	Owner	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Ship Age	orig. EOL	Retire Year	Year Built	LOA m (ft)	Sci. Berths
Global Class																						
Thomas G. Thompson	NAVY																32	2021	2036	1991	84 (274)	36
Roger Revelle	NAVY																27	2026	2041	1996	84 (274)	37
Atlantis	NAVY																26	2027	2042	1997	84 (274)	37
Marcus G. Langseth	LDEO																32	2020	2024	1991	71 (235)	35
Sikuliaq	NSF																9	2045	2045	2014	80 (261)	26
Ocean/Intermediate Class																						
Kilo Moana	NAVY																21	2032	2032	2002	57 (186)	29
Endeavor	NSF																47	2006	2022	1976	56 (185)	18
Atlantic Explorer	BIOS																41	2012	2026	1982	51 (168)	20
Neil Armstrong	NAVY																8	2045	2045	2015	73 (238)	24
Sally Ride	NAVY																8	2046	2046	2015	73 (238)	25
Regional Class																						
Hugh R. Sharp	UDel																18	2035	2035	2005	44 (146)	14
Taani	NSF																	2053	2053	2023	60 (199)	16
Narragansett Dawn	NSF																	2054	2054	2024	60 (199)	16
Gilbert R. Mason	NSF																	2054	2054	2024	60 (199)	16
Coastal/Local Class																						
Robert Gordon Sproul	SIO																42	2011	2025	1981	38 (125)	12
Pelican	LUMCON																38	2015	2025	1985	36 (116)	14
Walton Smith	U.Miami																23	2015	2030	2000	30 (96)	16
Savannah	SkIO/UG																22	2016	2031	2001	28 (92)	19
Blue Heron	UMINN																38	2015	2030	1985	26 (86)	6
Rachel Carson	UW																20	2033	2033	2003	22 (72)	9
	Ships	18	18	19	18	18	18	17	17	18	17	15	14	14	14	14						

UNOLS Fleet Improvement Committee, July 2023

**With apologies to Pete Seeger*

Opportunity

Midlife refits of Ocean Class AGORs
Replacing the Global Class AGORs

Ocean Class	Delivered	Midlife	Retired
AGOR 26 *Kilo Moana*	2002	- - - -	2032
	2027	2047	
AGOR 27 *Neil Armstrong*	2015	- - - -	2045
	2040	2060	
AGOR 28 *Sally Ride*	2016	- - - -	2046
	2041	2061	

Global Class	Delivered	Midlife	Retired
AGOR 23 *Thomas G. Thompson*	1991	2018	2036
AGOR 24 *Roger Revelle*	1996	2020	2041
AGOR 25 *Atlantis*	1997	2021	2042

Opportunity | *Nature does not hurry, yet everything is accomplished - Lao Tzu*

The long path to new ships: Ocean AGOR Capitalization

2003	House NDAA Report	$55.2M	"Rational plan for renewal of UNOLS fleet"
2004	Senate Appropriations	$4.0M	Ship contract design / live fire T&E
2004	Conference Approps	$2.0M	Ship contract design / live fire T&E
2005	Senate Appropriations	$3.5M	Defense research sciences / UNOLS
2005	Conference Approps	$1.8M	Defense research sciences / UNOLS
2006	Navy RDT&E	$4.0M	Ocean Class planning study & initial design
2006	House NDAA Bill	$4.0M	Renewal of UNOLS fleet / feasibility study
2006	House NDAA Report	$4.0M	Authorized SECNAV to develop a plan
2006	Senate NDAA Report	$4.0M	Directs Navy to seek $25M in FY27 for SCN
2006	Senate Appropriations	$4.0M	Directs Navy to design Ocean Class vessel
2007	Navy RDT&E	$4.0M	Directs Navy to initiate design study of hull
2008	Navy Shipbuilding PBR	- - - - -	Describes intent to build OCEAN AGOR
2008	Navy RDT&E	$3.0M	Designates funding for OCEAN AGOR Program
2009	Navy RDT&E	- - - - -	Evaluates alternative designes for OCEAN AGOR
2010	Navy RDT&E	$1.4M	Preliminary design & feasibility studies
2011	Navy Shipbuilding PBR	$88.6M	T-AGS 66 and OCEAN AGOR Class support
2011	Senate Appropriations	$88.6M	Ocean Class ships
2011	Final enacted budget	$88.6M	Ocean Class ships
2012	Navy Shipbuilding PBR	$89.0M	T-AGS 66 and OCEAN AGOR Class support
2012	Senate Appropriations	$89.0M	Ocean Class ships
2012	Final enacted budget	$89.0M	Ocean Class ships
2012	AGOR 27 keel laid	- - - - -	Guido Perla/Dakota Creek/WHOI
2015	AGOR 27 delivered	- - - - -	Finally!

Opportunity | *The waiting is the hardest part - Tom Petty*

Also a long path: Midlife refits for AGOR Global Class (TGT, RR, AT)

2013	Navy RDT&E PBR	$49.6M	Ocean Warfighting Environmental Applied Research
2013	Continuing resolution	$15.0M	Identified for AGOR midlife refit
2014	House NDAA Report	$63.7M	Service life extension of AGOR vessels
2015	Navy RDT&E	$65.4M	Ocean Warfighting Environmental Applied Research
2015	House NDAA Report	$45.4M	Service life extension of AGOR vessels
2015	Senate NDAA Report	- - - - -	No language regarding AGORs
2015	**Final enacted NDAA**	**$20.0M**	**$20M for AGOR midlife refits**
2016	House	$72.3M	Includes $30M for midlife refits
2016	Senate	$42.3M	Nothing for midlife refits
2016	**Final budget**	**$72.3M**	**Includes $30M for midlife refits**
2017	Navy RDT&E	$42.6M	Ocean Warfighting Environmental Applied Research
2017	House	$81.6M	Includes $30M for midlife refits
2017	Senate	$42.6M	Nothing for midlife refits
2017	**Final budget**	**$81.6M**	**Includes $30M for midlife refits**
2018	Navy RDT&E	$42.4M	Ocean Warfighting Environmental Applied Research
2018	House	$62.4M	Includes $15M for midlife refits
2018	Senate	$49.9M	Nothing for midlife refits
2018	**Final budget**	**$74.9M**	**Includes $15M for midlife refits**
2018	Midlife refit of *Thomas G Thompson*	$49.9M	Finally!
2020	Midlife refit of *Roger Revelle*	$49.9M	Finally!
2021	Midlife refit of *Atlantis*	$49.9M	Finally!

**** Substantial additional funding provided via NSF OI * SSSE programs, as well as via ONR DURIP programs***

Opportunity

I was seldom able to see an opportunity until it had ceased to be one -- Mark Twain

Fleet Improvement Committee Members

Dr. Kipp Shearman	OSU	Chair
Dr. Steven D'Hondt	URI	Operator
Dr. Angelicque White	UH	Operator
Dr. James Austin	UT-Austin	Non-Op
Dr. Joseph Montoya	GA Tech	Non-Op
Dr. Qing Wang	NPS	Member
CAPT Zoltan Kelety USN/Ret	SIO	Member
Dr. Masako Tominaga	WHOI	At-Large
Ethan Roth	UAF	Committee-Rep RVTEC
Dr. Doug Ricketts	UM-Duluth	Committee-Rep RVOC
Dr. Debbie Bronk	Bigelow	Ex-Officio Council

Opportunity

We can change the world and make it a better place. It is in your hands to make a difference -- Nelson Mandela

U.S. Academic Research Fleet Improvement Plan 2019 Update

Report of the UNOLS Fleet Improvement Committee

University-National Oceanographic Laboratory System

Global Class

Oceanographic Research Vessel

Science Mission Requirements

Antarctic Research Vessel Science Advisory Sub-Committee (ARV SASC) of the Office of Polar Programs (OPP) Advisory Committee

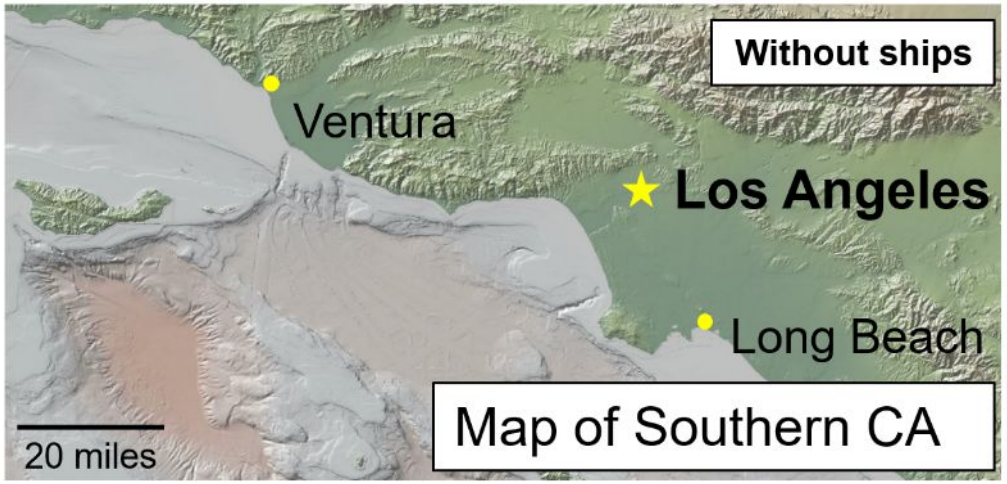
Report on DR #5, September 15, 2023

Members:

Alice Doyle, UNOLS
Amy Leventer, Colgate University (Chair)
Carlos Moffat, University of Delaware
Kristin O'Brien, University of Alaska Fairbanks - member and OPP/AC liaison
Deborah Steinberg, Virginia Institute of Marine Science

Tim McGovern, National Science Foundation - OPP liaison
Jonathan Michael Prince, National Science Foundation – OPP liaison

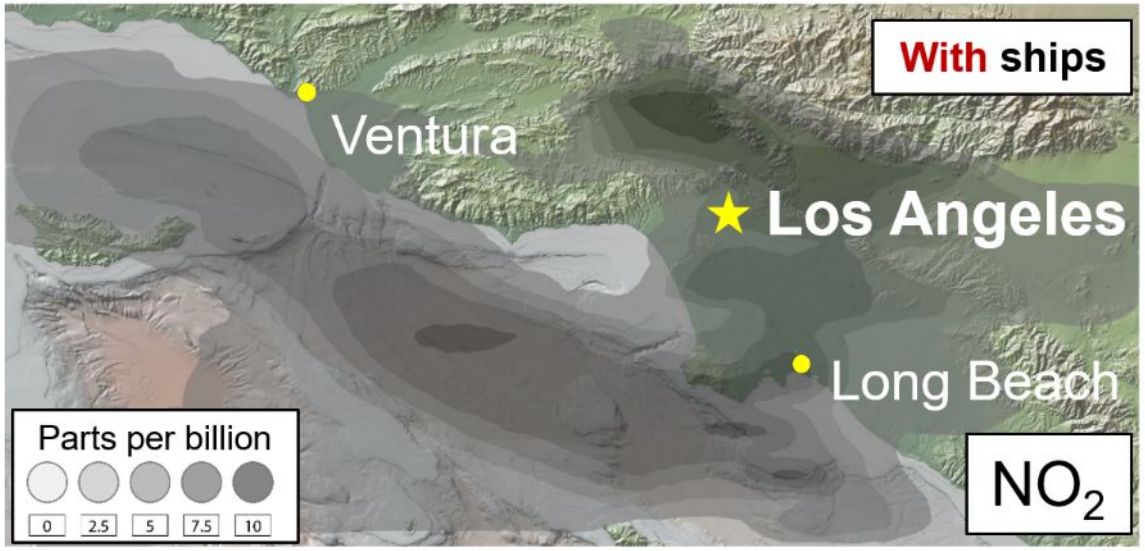
Ship Emissions Pollute and Harm Human Health

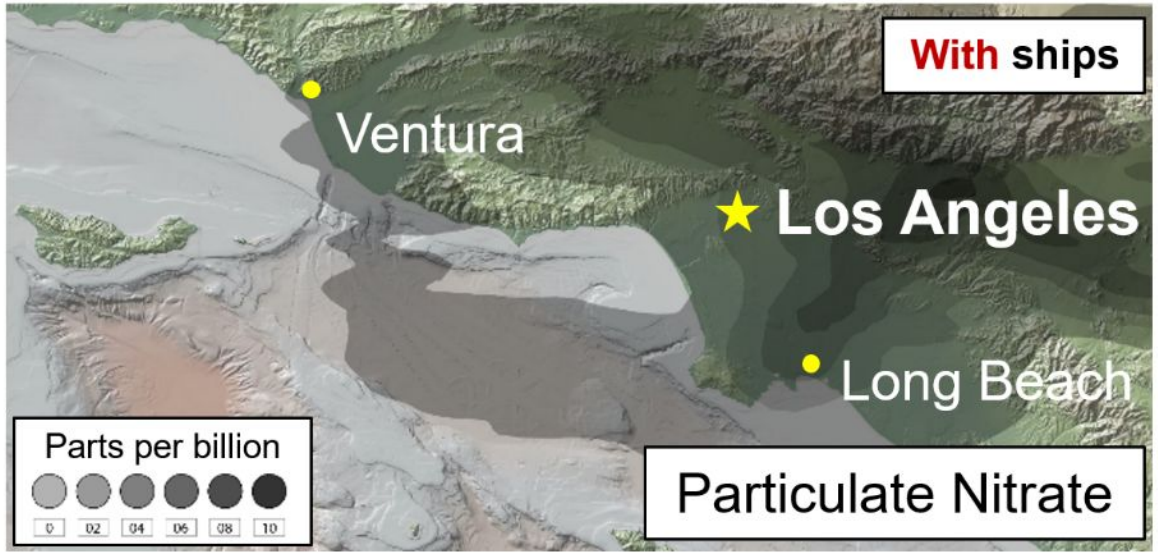


Diesel particulate matter is a known **toxic air contaminant.**

"…diesel exhaust still poses substantial risks to public health and the environment."

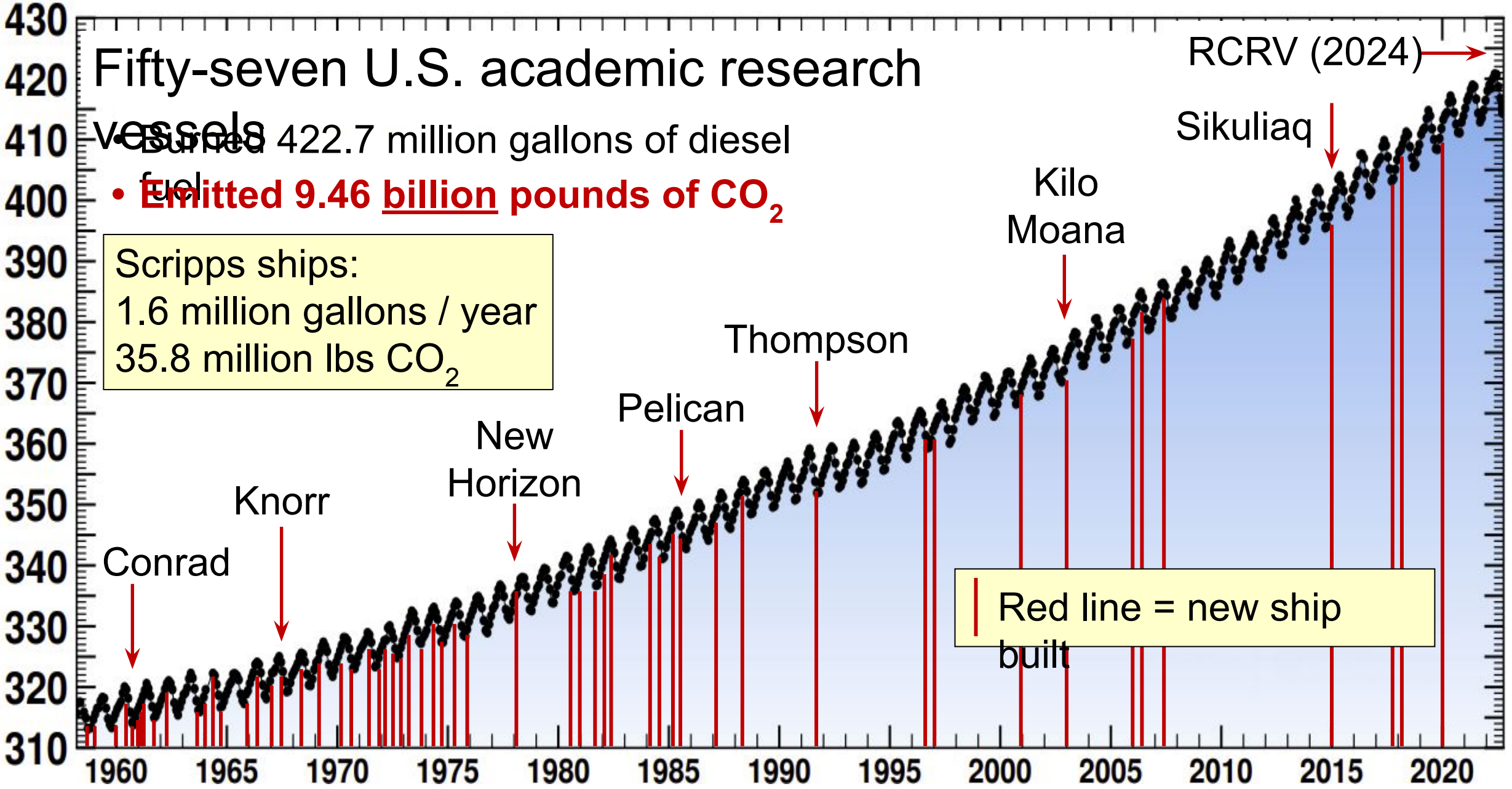
Positive (dark) values show higher concentration due to ship emissions





Dabdub et al., 2008, Air Quality Impacts of Ship Emissions in the South Coast Air Basin of California

Ships pollute the Earth with CO_2 (a greenhouse gas)

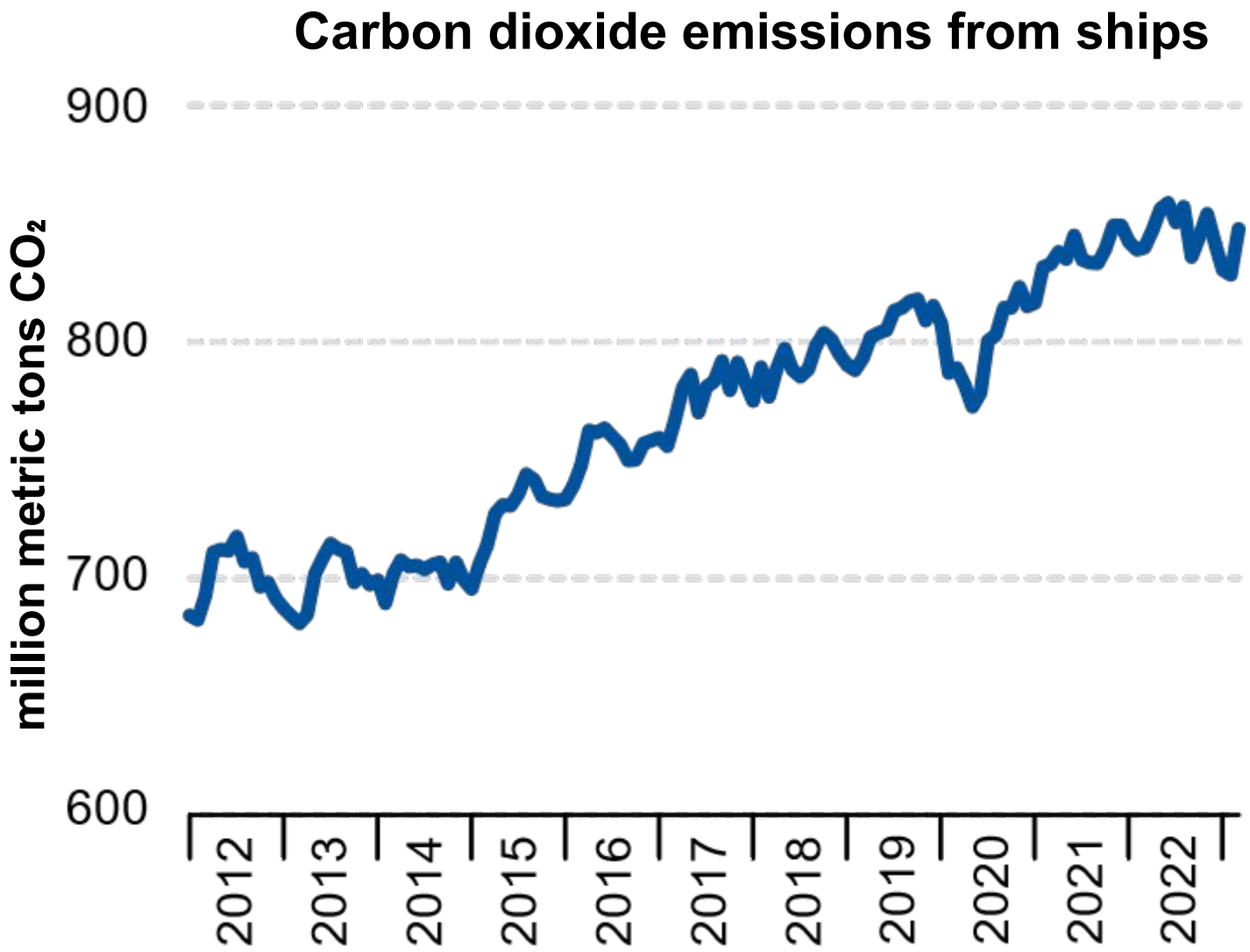


If ship emissions were a country…

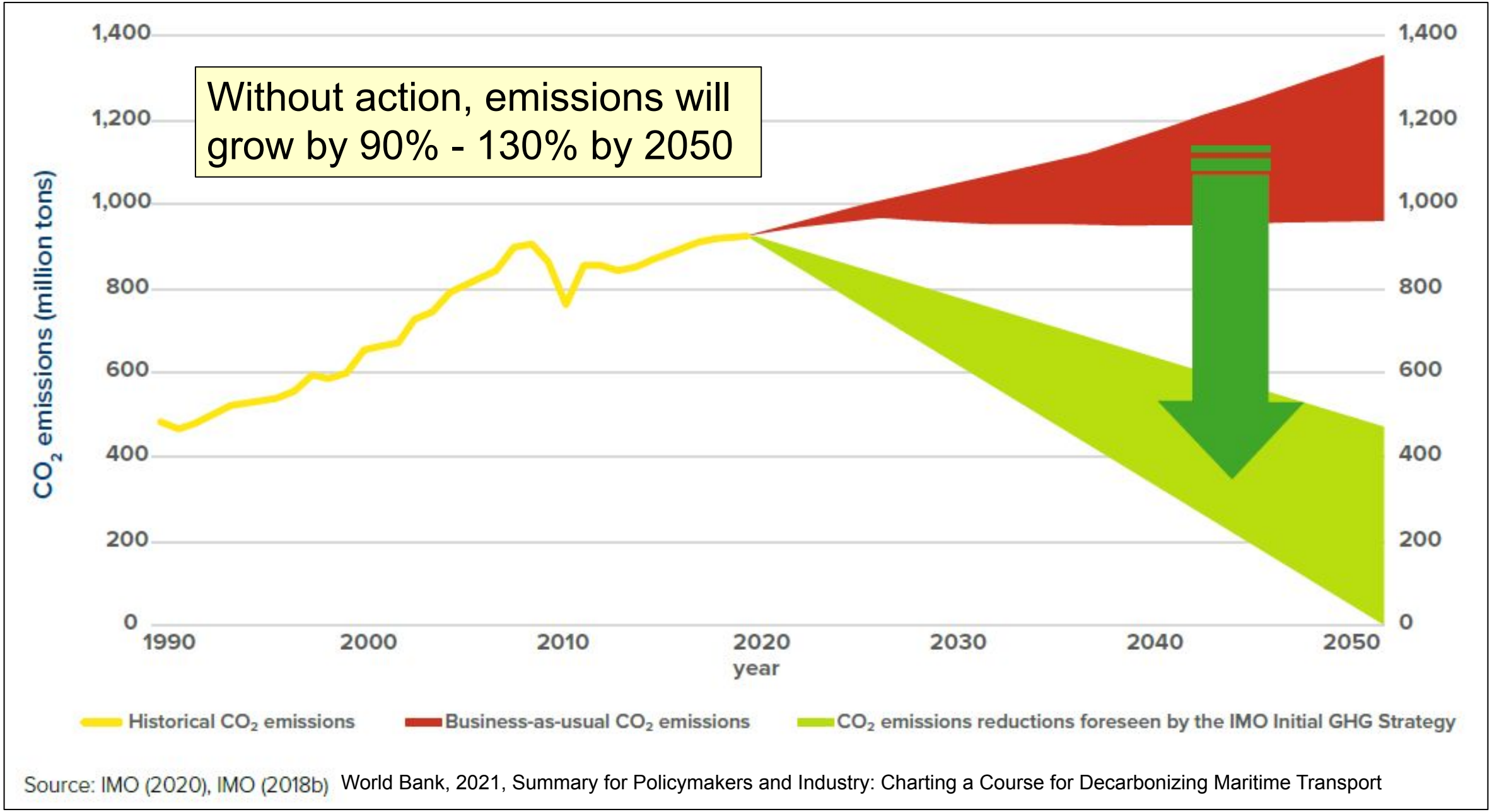
Worst global CO_2 emitters

(million metric tons CO_2)

1. China 11,680
2. United States 4,535
3. India 2,412
4. Russia 1,674
5. Japan 1,062
6. **Ships 850**
7. Iran 690
8. Germany 637
9. South Korea 621
10. Saudi Arabia 589



Maritime industry must stop using fossil fuels



Source: IMO (2020), IMO (2018b) World Bank, 2021, Summary for Policymakers and Industry: Charting a Course for Decarbonizing Maritime Transport