



DEEP OCEAN OBSERVING STRATEGY

A Workshop on the International Multidisciplinary Scientific
Requirements for the Deep Ocean Observing Strategy (DOOS)

7-9 December, 2016

La Jolla Shores Hotel

8110 Camina Del Oro
La Jolla, CA 92037

Scripps Seaside Forum

Scripps Institution of Oceanography
8610 Kennel Way,
La Jolla, CA 92037



Workshop Logistics

December 7-9, 2016

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Dear DOOS Workshop Participant,

Thank you for joining us for the upcoming DOOS Workshop in La Jolla.

As each participant at the Workshop will play a role in its proceedings and outcomes, we ask that you please carefully review the following Agenda and Guidance for Speakers, Rapporteurs, and Moderators.

Lisa will be at sea until December 4, so if there are questions or concerns please direct them to both her and Andrea McCurdy (mccurdy@ucar.edu).

FINALLY, as part of your participation in the Workshop we welcome statements on your national efforts in the deep-ocean realm. As you wish, please prepare a single slide providing an overview of these efforts for presentation during the second day of the sessions. (Please send/give these to Andrea prior to the meeting, or during Day 1.)

Thank you in advance for your time and energy. We look forward to seeing you, and in some instances, meeting you in a few weeks.

Our sincere regards,

DOOS Project Planning Committee and Project Team

GUIDANCE FOR WORKSHOP LEADERSHIP ROLES

Speakers:

- Summarize state of knowledge and as appropriate major gaps/needs for sustained observations
- Focus on themes rather than activities and results from individual programs or projects
- Draw connections to the other topics on the agenda
- Offer up at least one recommendation for DOOS – as a point of discussion

Rapporteurs:

- Make notes in PPT for easy display during discussion and summary
- Focus notes on the exchange of thoughts and ideas related to the topic
- Capture any decision, actions, or recommendations agreed to during the discussion

Moderators:

- Prepare comments and questions designed to keep the participants focused on the state of knowledge and gaps/needs for sustained observations
- Prepare requests for comments from participants as you think appropriate
- Keep session focused on arriving to at least one recommendation for the DOOS Project

Breakout session guidance

- Generally looking for how to structure the project to address what is needed
- More specific guidance will be provided should the first day's discussion warrant



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SCHEDULE AT-A-GLANCE

WEDNESDAY:

8:00	Continental Breakfast at Scripps Seaside Forum <i>(provided)</i>
8:30	Workshop Begins
10:30	Break
11:15	Workshop Continues
12:30	Lunch at Scripps Seaside Forum <i>(provided)</i>
1:30	Workshop Continues
3:00	Break
3:20	Workshop Continues
5:00	Reception <i>(a special thanks to Scripps)</i>
7:30	Dinner Off-Site <i>(not provided)</i>

THURSDAY:

8:00	Continental Breakfast at Scripps Seaside Forum <i>(provided)</i>
8:30	Workshop Begins
10:15	Break
10:45	Workshop Continues
12:45	Lunch at Scripps Seaside Forum <i>(provided)</i>
1:45	Workshop Continues
3:15	Break
3:30	Workshop Continues
6:30	Dinner Off-Site <i>(not provided)</i>



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FRIDAY:

8:00 Continental Breakfast at Scripps Seaside Forum *(provided)*

8:30 Workshop Begins

10:00 Break

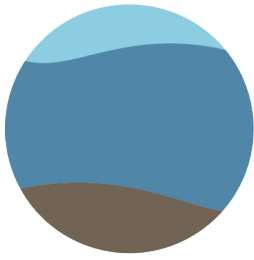
10:30 Workshop Continues

12:00 Lunch at Scripps Seaside Forum *(provided)*

Workshop officially adjourns

1:00 Planning Committee Reconvenes

5:00 Planning Committee Adjourns



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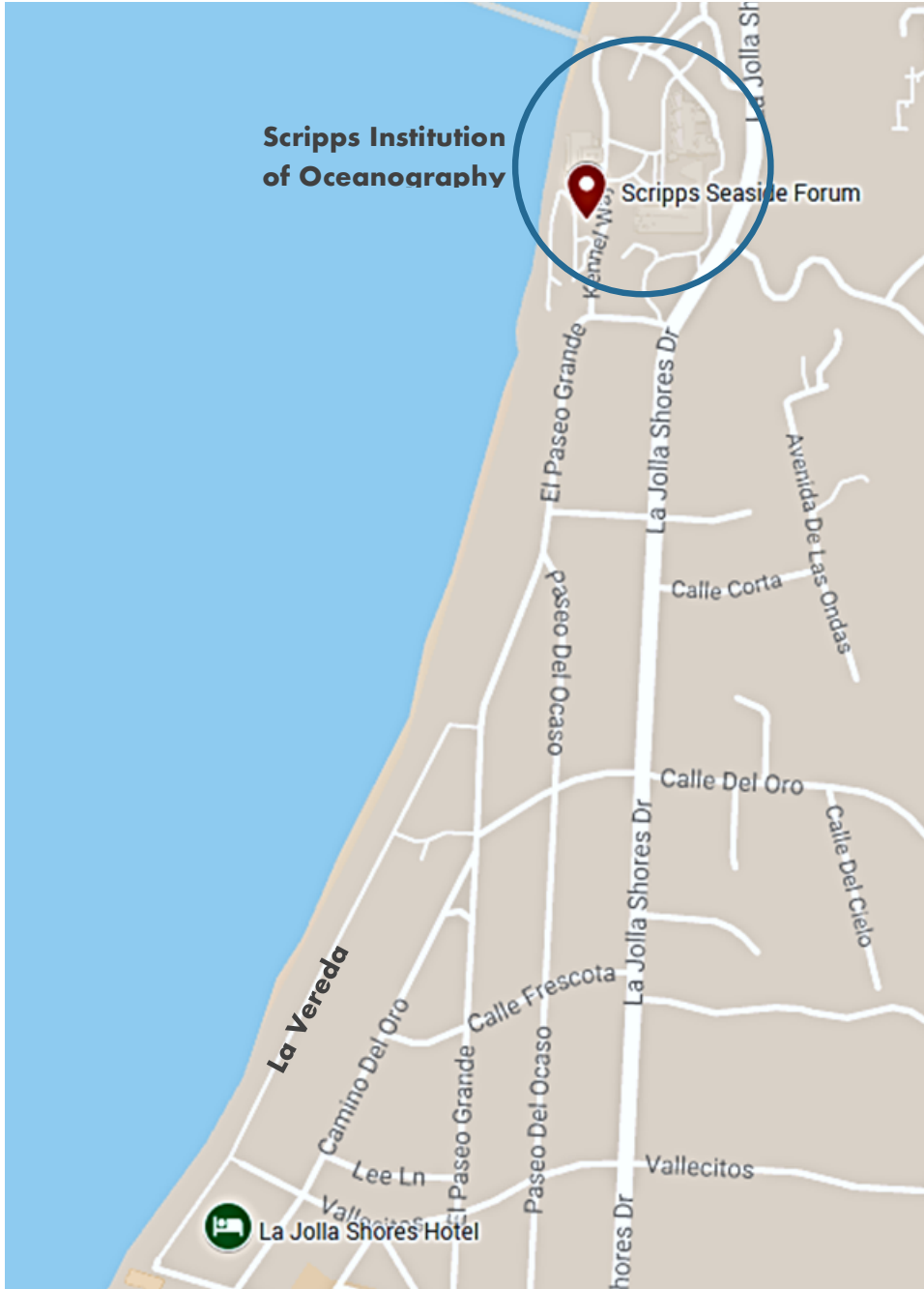
Scripps Seaside Forum

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DIRECTIONS

From La Jolla Shores Hotel (0.7 mile, approx. 15min walk): Head northeast on La Vereda for 0.4 miles, turn left onto El Paseo Grande. After 0.3 miles, turn left onto Kennel Way. Forum is on the left.



Scripps Seaside Forum

Scripps Institution of

Oceanography

8610 Kennel Way

La Jolla, CA 92037

La Jolla Shores Hotel

8110 Camino Del Oro

La Jolla, CA 92037

For those unable to walk, please see Hotel Shuttle information and schedule on next page.

HOTEL SHUTTLE

December 7, 2016:

- Shuttle drop offs from hotel to Scripps Seaside Forum
 - 7:45am - 7 guests
 - 7:55am - 7 guests
- Shuttle pickups from Scripps Seaside Forum back to hotel
 - 6:30pm - 7 guests
 - 6:40pm - 7 guests

December 8, 2016:

- Shuttle drop offs from hotel to Scripps Seaside Forum
 - 7:45am - 7 guests
 - 7:55am - 7 guests
- Shuttle pickups from Scripps Seaside Forum back to hotel
 - 6:30pm - 7 guests
 - 6:40pm - 7 guests

December 9, 2016:

- Shuttle drop offs from hotel to Scripps Seaside Forum
 - 7:45am - 7 guests
 - 7:55am - 7 guests
- Shuttle pickups from Scripps Seaside Forum back to hotel
 - 12:45pm - 7 guests
 - 12:55pm - 7 guests
 - 5:00pm - 7 guests

DAY 1: WEDNESDAY DECEMBER 7, 2016

Time	Agenda Item	Person	Allocation
8:00	Continental Breakfast <i>(provided)</i>		
8:30	I. Welcome from the Director of the Scripps Institution of Oceanography	M. Leinen	5 min
8:35	II. Introduction to the Framework for Ocean Observing and Essential Ocean Variables	A. Fischer	10 mins
8:45	III. Day 1: Objectives and Introductions a. DOOS History and Motivation b. Workshop Goals and Agenda	L. Levin	20 mins
9:05	IV. Participant Introductions	All	30 min
9:35	V. Deep Ocean Themes & Case Studies	<i>Moderator:</i> P. Heimbach	Format: 12 min for each talk
	a. Observing and modeling climate change/deep ocean roles b. Ventilation and Circulation (Transient tracers) c. Turbulence <i>Rapporteur:</i> F. DeLeo	B. Sloyan T. Tanhua K. Katsumata	
10:30	Break		
11:15	VI. Deep Ocean Themes & Case Studies (Cont.)	<i>Moderator:</i> K. Oguri	Format: 12 min for each talk
	a. Biogeochemical drivers – nutrients/ oxygen/ carbon cycling/ b. Ecosystem consequences of changing biogeochemistry c. Seabed mining, oil and gas, carbon sequestration d. Deep Water Fish and Fisheries e. Biodiversity <i>Rapporteur:</i> F. DeLeo	R. Wanninkhof N. LeBris C. Smith T. Koslow H. Kitazato	
12:30	Lunch <i>(provided)</i>		
1:30	VII. DOOS Scope – Defining Scientific Goals	<i>Moderators:</i> H. Ruhl P. Heimbach	90 min
	<i>Rapporteurs:</i> Y. Eddebbar and J. Barry Plenary Discussion Questions: <ul style="list-style-type: none"> • What scientific questions can a deep-sea observing strategy contribute? • What synergies result from integrating programs? <ul style="list-style-type: none"> ◦ What scientific problems will these address? • How should this be reflected in the Terms of Reference? 		



Workshop Agenda

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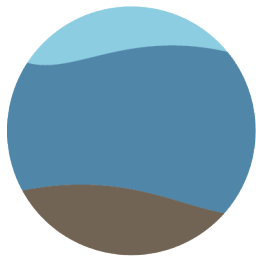
3:00	Break		
3:20	VIII. State of Deep Ocean Observing		
	a. Review of Community Input to DOOS Consultative Draft	A. McCurdy	20 min
3:40	b. Overview of Deep-Ocean Observing Inventory	L. Smith	30 min
4:10	c. Overview of National Efforts (One slide per nation)	Moderator: A. Fischer	30 min
4:40	IX. Day 1 Wrap-Up	L. Levin	20 min
	a. Prep discussion items for Day 2		
5:00	Reception (a special thanks to Scripps)		
7:30	Dinner Off-Site		

DAY 2: THURSDAY DECEMBER 8, 2016

Time	Agenda Item	Person	Allocation
8:00	Continental Breakfast <i>(provided)</i>		
8:30	I. Day 2: Objectives	L. Levin	15 min
8:45	II. DOOS Essential Ocean Variable (EOV) Overview		90 min
	<i>GOOS Panel EOVs vs. Deep EOVs (read-ahead graphic provided)</i>	<i>Speakers:</i>	
	a. Physical <i>Moderator: N. Zilberman/Rapporteur: S. Song</i>	B. Sloyan	Format: 10 min talk 20 min discussion
	b. Biogeochemistry <i>Moderator: F. Janssen/Rapporteur: R. Wanninkhof</i>	T. Tanhua	
	c. Biology and Ecosystem <i>Moderator: P. Snelgrove/Rapporteur: H. Harden-Davies</i>	P. Miloslavich	
10:15	Break		
10:45	III. Technology Developments	<i>Speakers:</i>	90 min
	a. Sensors <i>Moderator: M. Alford/Rapporteur: D. Checkley (T. Martz)</i>	B. Howe	15 min talk 30 min discussion
	b. Platforms <i>Moderator: S. Baumann-Pickering/Rapporteur: B. Kirkpatrick</i>	U. Send	15 min talk 30 min discussion
12:15	c. DOOS Requirements and Opportunities - Geographic Locations <i>Moderator: M. Lankhorst/Rapporteur: R. Perez</i>		30 min
12:45	Lunch <i>(provided)</i>		
1:45	IV. Interdisciplinary Task Team Breakouts <i>(Topics Subject to Change)</i> Goal: Set up the teams or working groups that move DOOS forward		90 min
	a. Observing Needs - Climate Science and Impacts <i>Moderator: L. Talley/Rapporteur: P. Snelgrove</i>	Group 1	
	b. Observing Needs - Science for Managing Societal Uses of the Deep Ocean <i>Moderator: K. Gjerde/Rapporteur: F. DeLeo</i>	Group 2	
	c. Observing Needs - Technology Advances <i>Moderator: O. Kawka/Rapporteur: A. Soule</i>	Group 3	
	TBD...based on workshop discussions		
3:15	Break		
3:30	IV. Plenary Session - Review Task Team Breakout Results <i>Moderator: S. Wijffels/Rapporteur: D. Rudnick</i>	All	60 min
4:30	V. Closing	L. Levin	30 min
	a. Recap Findings		
	b. Prep discussion items for Day 3 including Terms of Reference Handout for Input		
6:30	Dinner Off-Site		

DAY 3: FRIDAY DECEMBER 9, 2016

Time	Agenda Item	Person	Allocation
8:00	Continental Breakfast <i>(provided)</i>		
8:30	I. Funding Opportunities and Data Sources - including academic, industry, & government linkages <i>Moderator: K. Yarincik/Rapporteur: S. Mulsow</i>	K. Yarincik	30 min
9:00	II. Data Management Challenges & Opportunities <i>Moderator: J. Thomas/Rapporteur: J. Swift</i>	J. Thomas	60 min
	a. Infrastructure: Data discovery, Access, Transfer, Metadata, Archive	W. Appeltans	Format: 10 min talk 20 min discussion
	b. Data Accessibility, Usability, and Interoperability	K. Stocks	
10:00	Break		
10:30	III. Day 3: Objectives and Input on Terms of Reference	L. Levin A. Fischer	30 min
11:00	IV. Assess Next Steps and Deliverables	Planning Committee TBA	60 min
	a. Consensus on Priority Issues b. DOOS Directions: Task Team or Working Group Formation c. Workshop Recommendations		
12:00	Lunch <i>(provided)</i> - Official Workshop Adjourns		
1:00	Planning Committee Reconvenes from 1- 5 PM to <ul style="list-style-type: none"> Summarize deliverables Prepare report Finalize DOOS Terms of Reference Create Action Plan 	Planning Committee	240 min
5:00	Planning Committee Adjourns		



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Participants

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Matthew	Alford	<i>Scripps Institution of Oceanography</i>
Ward	Appeltans	<i>Intergovernmental Oceanographic Commission of UNESCO</i>
Jim	Barry	<i>Monterey Bay Aquarium Research Institute</i>
Simone	Baumann-Pickering	<i>Scripps Institution of Oceanography</i>
Fabio	Cabrera De Leo	<i>Oceans Network Canada</i>
Dave	Checkley	<i>Scripps Institution of Oceanography</i>
Kruti	Desai	<i>Consortium for Ocean Leadership</i>
Yassir	Eddebbar	<i>Scripps Institution of Oceanography</i>
Albert	Fischer	<i>Intergovernmental Oceanographic Commission of UNESCO</i>
Kristina	Gjerde	<i>International Union for Conservation of Nature</i>
Harriet	Harden-Davis	<i>University of Wollongong</i>
*Patrick	Heimbach	<i>University of Texas at Austin</i>
Bruce	Howe	<i>University of Hawaii at Manoa</i>
*Felix	Janssen	<i>Alfred-Wegener Institute</i>
*Greg	Johnson	<i>National Oceanic and Atmospheric Administration</i>
Katsuro	Katsumata	<i>Japan Agency for Marine-Earth Science and Technology</i>
Orest	Kawka	<i>University of Washington</i>
Barbara	Kirkpatrick	<i>Gulf of Mexico Coastal Ocean Observing System</i>
Hiroshi	Kitazato	<i>Japan Agency for Marine-Earth Science and Technology</i>
Tony	Koslow	<i>Scripps Institution of Oceanography</i>
Matthias	Lankhorst	<i>Scripps Institution of Oceanography</i>
Nadine	Le Bris	<i>Université Pierre et Marie Curie, Paris 6</i>
*Lisa	Levin	<i>Scripps Institution of Oceanography</i>
Todd	Martz	<i>Scripps Institution of Oceanography</i>
Andrea	McCurdy	<i>University Corporation for Atmospheric Research</i>
Patricia	Miloslavich	<i>Universidad Simón Bolívar</i>
Sandor	Muslow	<i>International Seabed Authority</i>
Kazumasa	Oguri	<i>Japan Agency for Marine-Earth Science and Technology</i>
Renellys	Perez	<i>University of Miami</i>
Dean	Roemmich	<i>Scripps Institution of Oceanography</i>
Nick	Rome	<i>Consortium for Ocean Leadership</i>
Daniel	Rudnick	<i>Scripps Institution of Oceanography</i>
*Henry	Ruhl	<i>National Oceanography Centre</i>
Uwe	Send	<i>Scripps Institution of Oceanography</i>
*Bernadette	Sloyan	<i>Commonwealth Scientific and Industrial Research Organisation, Australia</i>
Craig	Smith	<i>University of Hawaii at Manoa</i>
Leslie	Smith	<i>Your Ocean Consulting, LLC</i>
Paul	Snelgrove	<i>Memorial University</i>
*Sun	Song	<i>Institute of Oceanology, Chinese Academy of Sciences</i>
Adam	Soule	<i>Woods Hole Oceanographic Institution</i>



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Karen	Stocks	<i>Scripps Institution of Oceanography</i>
James	Swift	<i>Scripps Institution of Oceanography</i>
Lynne	Talley	<i>Scripps Institution of Oceanography</i>
*Toste	Tanhua	<i>GEOMAR Helmholtz Centre for Ocean Research</i>
Julie	Thomas	<i>Scripps Institution of Oceanography</i>
*Rik	Wanninkhof	<i>National Oceanic and Atmospheric Administration</i>
Susan	Wijffels	<i>Commonwealth Scientific and Industrial Research Organisation, Australia</i>
Kristen	Yarincik	<i>Consortium for Ocean Leadership</i>
Nathalie	Zilberman	<i>Scripps Institution of Oceanography</i>

**Program Committee Members*