www.isope.org; www.isope2012.org

June 17–22, Rhodes (Rodos), Greece

The Twenty-second (2012) International

Offshore and Polar Engineering Conference

In addition** ISOPE **specialty symposia:

1st Tsunami & Safety
1st Asset Integrity
3rd Arctic Science & Technology
2nd Arctic Materials
3rd Renewable Energy & Environment
4th Sloshing Dynamics & Design
4th Frontier & Clean Energy Tech
10th High-Performance Materials
5th Strain-Based Design

ISOPE-2012

Rodos Palace Hotel, Rhodes, Greece, June 17–22

Technical Program

Refereed papers from 52 countries in 150 technical general
Plenary and keynote presentations
General Information, Reservations, Publications and Program
Updates on www.isope.org www.isope2012.org
Forms for Advance Registration and Venue Hotel:
Inside this program and **on www.isope.org www.isope2012.org**

Organized by:
Technical Program Committee, ISOPE
Sponsored by:
International Society of Offshore and Polar Engineers (ISOPE)
with cooperating organizations (listed inside)

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Cupertino, CA 95015-0189, USA
Fax: +1-650-254-2038
meetings@isope.org; www.isope.org

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ISOPE Awards, Scholarship, and Student Forum:
Presentation at Banquet

Conference Opening Session

Annual Conference Banquet

More photos on www.isope.org and www.isope2012.org
ISOPE-2011 Maui
21st Annual International Ocean and Polar Engineering
Conference, Maui, June 19-24, 2011

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Welcome to ISOPE-2012 Conference

We greatly appreciate the excellent responses with **1250+** abstracts and help we have received from colleagues around the world in the successful organization of the 22nd International Offshore and Polar Engineering Conference (ISOPE-2012), Rhodes, Greece, June 17–22, 2012. The Conference features **150** sessions of *peer-reviewed* papers and **8** keynote presentations from more than **52 countries,** including the ISOPE specialty symposia as a part of the ISOPE-2012 Conference.

The conference program is issued in 2 versions: Printed and internet (www.isope.org and www.isope2012.org). To meet the page limit, only the first author data are listed in the printed version, and the internet version lists all authors.

The purposes of the ISOPE conference are to:

* Promote technological progress and activities, international technological transfer and cooperation, and opportunities for engineers to maintain and improve technical competence; and
* Provide a timely international forum for technical activities, cooperation, opportunity and fellowship among researchers and engineers

by developing focused session topics with high quality papers (in both originality and significance) accepted through rigorous review, establishing high international standards for publication and worldwide distribution and promoting interdisciplinary interaction between academia and industry.

The International Society of Offshore and Polar Engineers (ISOPE) has already held **49 successful international meetings** with peer-reviewed papers:

- 1st (1990) European Offshore Mechanics Symposium (**EUROMS**-90) Trondheim; EUROMS-99 Moscow;
- 1st (1990) Pacific/Asia Offshore Mechanics Symposium (**PACOMS**-90) Seoul; PACOMS-94 Beijing; 1996 Pusan, 2002 Daejeon, 2004 Vladivostok, 2006 Dalian, 2008 Bangkok, 2010 Busan
- Annual **ISOPE** conferences, starting in Edinburgh, 1991 were held in San Francisco, Singapore, Osaka, The Hague, Los Angeles, Honolulu, Montréal, Brest, Seattle, Stavanger, Kitakyushu, Honolulu, Toulon, Seoul, San Francisco, Lisbon, Vancouver, Osaka, Beijing and Maui. Since 1992, the annual ISOPE conference program has been the world's largest of its kind with peer-reviewed papers;
- 1st (1995) ISOPE Ocean Mining Symposium (**OMS**-95), Tsukuba, 1995, Seoul, Goa, Szczecin, Tsukuba, Changsha, Lisbon; Chennai
- 1st (1996) International Deep-Ocean Technology (**IDOT**-96) Symposium and Workshop, 1996 Los Angeles; 2001 Stavanger and 2009 Beijing;
- ISOPE **HPM** Symposium: Honolulu 2003, Toulon 2004, Seoul 2005, San Francisco 2006, Lisbon 2007, Vancouver 2008; Osaka 2009 and Beijing 2010 ;
- ISOPE Series of specialty symposia : **ANGT**: Seoul 2005-; **Strain-Based Design SBD**: Lisbon 2007-,**Nanotechnology NANOS**: Lisbon 2007 Frontier Energy; **Sloshing Dynamics, Sloshing**-2009-, **Renewable Energy/Environment**, **REES**-2010; Arctic Science & Tech, **Arctic**-2010-; **Arctic Materials**-2011-; **Asset Integrity**-2012-

On behalf of the Technical Program Committee, it is our pleasure to welcome participants from all over the world to the ISOPE-2012 Conference in Rhodes, Greece.

Jin S Chung,	Demos Angelides	Ronald H Knapp
USA	Greece	USA
Xizhao Jiang	Shigeru Naito	Michael Isaacson
China	Japan	Canada

Co-chairmen of the ISOPE-2012 Conference

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SUNDAY JUNE 17

09:00 ISOPE Board of Directors Meeting	Executive D
10:30 ISOPE-2010 Executive Committee Meeting EUROMS and PACOMS Executive Committees	Executive D
15:00-18:00	
CONFERENCE REGISTRATION	Lobby
17:00-18:00	
WELCOME RECEPTION	Outdoor Pool Garden
Tour Information	Visit tour desk in ISOPE registration area: www.isope.org
Spouse Program	Join Tour program: see www.isope.org

MONDAY June 18

On-Site Registration starts at 07:30	Lobby
07:30 Session Chair/Co-chair Briefing	Lobby
08:30 Conference Opening	Jupiter
08:30	
1. OCEAN AND ENERGY INDUSTRY REVIEW—2011	Jupiter
10:30	
2. LNG SLOSHING I: GTT Progress	**Room 1**
3. VORTEX-INDUCED VIBRATIONS I	**Room 2**
4. RENEWABLE ENERGY I: Wind 1: Foundations 1	**Room 3**
5. TSUNAMI I: 2011 Tohoku Tsunami 1	**Room 4**
6. ASSET INTEGRITY I	**Room 5**
7. ENVIRONMENT I: Oil Spill and Emission	**Room 6**
8. SBD I: Materials	**Room 7**
9. FRONTIER ENERGY I: Clean Energy	**Room 8**
10. RISK & RELIABILITY I	**Room 9**
11. UNDERSEA I: Operation and Communication 1	**Room 10**
14:00	
12. LNG SLOSHING II: Physics & Coupling	**Room 1**
13. VORTEX-INDUCED VIBRATIONS II	**Room 2**
14. RENEWABLE ENERGY II: Wind 2: Foundations 2	**Room 3**
15. TSUNAMI II: 2011 Tohoku Tsunami 2	**Room 4**
16. ASSET INTEGRITY II	**Room 5**
17. ENVIRONMENT II: Physical & Chemical Processes	**Room 6**
18. SBD II: Numerical Modeling	**Room 7**
19. FRONTIER ENERGY II: Clean Coal	**Room 8**
20. RISK & RELIABILITY II	**Room 9**
21. UNDERSEA II: Operation and Communication 2	**Room 10**
16:20	
22. LNG SLOSHING III: LNG Tank Design 1	**Room 1**
23. HYDRODYNAMICS I: MetOcean 1	**Room 2**
24. RENEWABLE ENERGY III: Wind 3: Substructures	**Room 3**
25. TSUNAMI III: Generation & Warning 1	**Room 4**
26. ASSET INTEGRITY III	**Room 5**
27. ENVIRONMENT III: Water & Sediment Qualities	**Room 6**
28. SBD III: Strain Capacity Characterization	**Room 7**
29. FRONTIER ENERGY III: Hydrate Fundamental	**Room 8**
30. RISK & FATIGUE	**Room 9**
31. UNDERSEA III: Vehicle and Control 1	**Room 10**

18:30 **Find from the bulletin board**
ISOPE Technical Committee Meetings

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Tuesday June 19

07:30 Session Chair/Co-chair Briefing — **Lobby**

08:00

32. LNG SLOSHING IV: LNG Tank Design 2	Room 1
33. HYDRODYNAMICS II: MetOcean 2	Room 2
34. RENEWABLE ENERGY IV: Wind 4: Dynamics 1	Room 3
35. TSUNAMI IV: Generation & Warning 2	Room 4
36. ASSET INTEGRITY IV	Room 5
37. COASTAL I:Waves & Modeling 1	Room 6
38. SBD IV: Fracture Mechanics	Room 7
39. FRONTIER ENERGY IV: Hydrate Development	Room 8
40. OFFSHORE MECHANICS I: Floating Dynamics 1	Room 9
41. UNDERSEA IV: Vehicle and Control 2	Room 10

10:30

42. LNG SLOSHING V: Sloshing Tests	Room 1
43. HYDRODYNAMICS III: MetOcean 3	Room 2
44. RENEWABLE ENERGY V: Wind 5: Floating 1	Room 3
45. TSUNAMI V: Generation & Warning 3	Room 4
46. ADVANCED SHIP TECH I: Ultimate Strength	Room 5
47. COASTAL II: Waves & Modeling 2	Room 6
48. SUBSEA, PIPELINES, RISERS I: NORD Stream	Room 7
49. FRONTIER ENERGY V: Hydrate Modeling	Room 8
50. OFFSHORE MECHANICS II: Floating Dynamics 2	Room 9
51. ARCTIC MATERIALS I	Room 10

13:00

Chung Award Lecture — **Room 2**

14:00

52. LNG SLOSHING VI: CFD	Room 1
53. HYDRODYNAMICS IV: Freak and Long Waves	Room 2
54. RENEWABLE ENERGY VI: Wind 6: Floating 2	Room 3
55. TSUNAMI VI: Propagation & Flooding	Room 4
56. ADVANCED SHIP TECH II: At-Sea Explosions	Room 5
57. COASTAL III: Waves & Modeling 3	Room 6
58. SUBSEA, PIPELINES, RISERS II: New Concept Develop.	Room 7
59. GEOTECH I: Suction Piles	Room 8
60. OFFSHORE MECHANICS III: Systems I	Room 9
61. ARCTIC MATERIALS II	Room 10

16:20

62. LNG SLOSHING VII: Structural Responses	Room 1
63. HYDRODYNAMICS V: Wave Loading	Room 2
64. RENEWABLE ENERGY VII: Wind 7: Analysis Tools	Room 3
65. TSUNAMI VII: Structure & Sediment 1	Room 4
66. HPM I: Adv Materials & Structures 1	Room 5
67. COASTAL IV: Breakwaters & Waves 1	Room 6
68. SUBSEA, PIPELINES, RISERS III: Panel	Room 7
69. GEOTECH II: Offshore Foundations	Room 8
70. OFFSHORE MECHANICS IV: Systems II	Room 9
71. ARCTIC I: Navigation in Pack Ice	Room 10

15:30 Awards Committee Meeting — **Executive D**
16:30 Board of Editors Meeting — **Executive D**

18:00 Student Forum (advance reservation to isope-2@isope-org)

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WEDNESDAY JUNE 20

07:30 Session Chair/Co-chair Briefing — **Lobby**

08:00

72. RENEWABLE ENERGY XVI: Wave 4	Room 1
73. HYDRODYNAMICS VI: Floating-Body Dynamics 1	Room 2
74. RENEWABLE ENERGY VIII: Wind 8: Concepts	Room 3
75. TSUNAMI VIII: Structure & Sediment 2	Room 4
76. HPM II: Adv Materials & Structures 2	Room 5
77. COASTAL V: Breakwaters & Waves 2	Room 6
78. SUBSEA, PIPELINES, RISERS IV: Improved Perform.	Room 7
79. GEOTECH III: Soil Improvement	Room 8
80. FRONTIER ENERGY VI:Ocean Mining 1: Minerals	Room 9
81. ARCTIC II: Ice Mechanics	Room 10

10:30

82. RENEWABLE ENERGY XVII: Wave 5	Room 1
83. HYDRODYNAMICS VII: Floating-Body Dynamics 2	Room 2
84. RENEWABLE ENERGY IX: Wind 9: Codes & Design	Room 3
85. TSUNAMI IX: RisK Assessment 1	Room 4
86. HPM III: Composites	Room 5
87. COASTAL VI: Breakwaters & Waves 3	Room 6
88. SUBSEA, PIPELINES, RISERS V: Component Develop	Room 7
89. GEOTECH IV: Cyclic Loading	Room 8
90. FRONTIER ENERGY VII:Ocean Mining 2: Systems	Room 9
91. ARCTIC III: Coastal Arctic Properties	Room 10

12:00 ISOPE Board of Directors Meeting — **Executive D**
13:15 Plenary Presentation: Pipeline — **Room 1**

14:00

92. RENEWABLE ENERGY XVIII: Wave 6: Resources	Room 1
93. HYDRODYNAMICS VIII: Floating-Body Dynamics 3	Room 2
94. RENEWABLE ENERGY X: Wind 10: Resources	Room 3
95. TSUNAMI X: Risk Assessment 2	Room 4
96. HPM IV: Fatigue & Fracture 1	Room 5
97. COASTAL VII: Wave-Structure Interaction	Room 6
98. SUBSEA, PIPELINES, RISERS VI: Fatigue Assessment	Room 7
99. GEOTECH V: Slope Stability	Room 8
100. OFFSHORE MECHANICS V: Deepwater Installation	Room 9
101. ARCTIC IV: Ice Environment & Forecasting	Room 10

16:20

102. RENEWABLE ENERGY XIX: Tidal & Current 1	Room 1
103. HYDRODYNAMICS XIII: DP & Control	Room 2
104. RENEWABLE ENERGY XI: Wind 11: Power 4	Room 3
105. ADVANCED SHIP TECH III: Collision & Vibration	Room 4
106. HPM V: Fatigue & Fracture 2	Room 5
107. COASTAL VIII: Estuary Hydraulics	Room 6
108. SUBSEA, PIPELINES, RISERS VII: Adv Analysis 1	Room 7
109. GEOTECH VI: Piles & Foundations	Room 8
110. OFFSHORE MECHANICS VI: Design & Installation	Room 9
111. LNG SLOSHING VIII: Panel	Room 10

19:00 — **Super Dome Pool**

Annual Conference Banquet

22nd ISOPE Cultural Event, Best Paper, Best Student Paper, Outstanding Students and Awards

Don't forget the banquet ticket.

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THURSDAY JUNE 21

07:30 Session Chair/Co-chair Briefing	**Lobby**
08:00	
112. RENEWABLE ENERGY XX: Tidal & Current 2	**Room 1**
113. HYDRODYNAMICS IX: CFD 1	**Room 2**
114. RENEWABLE ENERGY XII: Wind 12:	**Room 3**
115. ADVANCED SHIP TECH IV: Slamming & Load	**Room 4**
116. HPM VI: Fatigue & Fracture 3	**Room 5**
117. COASTAL IX: Coastal Sediment 1	**Room 6**
118. SUBSEA, PIPELINES, RISERS VIII: Install. & Fabric	**Room 7**
119. GEOTECH VII: Consolidation & Seepage	**Room 8**
120. OFFSHORE MECHANICS VII: Moored Structures	**Room 9**
121. ARCTIC V: Ice Structure Interaction	**Room 10**
10:30	
122. RENEWABLE ENERGY XXI: Tidal & Current 3	**Room 1**
123. HYDRODYNAMICS X: CFD 2	**Room 2**
124. RENEWABLE ENERGY XIII: Wave 1	**Room 3**
125. ADVANCED SHIP TECH V: Propulsion	**Room 4**
126. HPM VII: Shipbuilding Steels	**Room 5**
127. COASTAL X: Coastal Sediment 2	**Room 6**
128. SUBSEA, PIPELINES, RISERS IX: Analysis 2	**Room 7**
129. GEOTECH VIII: Material Testing	**Room 8**
130. OFFSHORE MECHANICS VIII: FSRU 1	**Room 9**
131. ARCTIC VI: Operations in Ice)	**Room 10**
12:00 Ocean Mining Executive Committee	**Executive D**
14:00	
132. RENEWABLE ENERGY XXII: Thermal Energy	**Room 1**
133. HYDRODYNAMICS XI: CFD 3	**Room 2**
134. RENEWABLE ENERGY XIV: Wave 2	**Room 3**
135. ADVANCED SHIP TECH VI: System design	**Room 4**
136. HPM VIII: Advances in Welding Technology 1	**Room 5**
137. COASTAL XI: Coastal Sediment 3	**Room 6**
138. SUBSEA, PIPELINES, RISERS X: Flow Effects	**Room 7**
139. GEOTECH IX: Soil Properties	**Room 8**
140. OFFSHORE MECHANICS IX: FSRU 2	**Room 9**
141. ARCTIC VII: Ice Modeling & Operations	**Room 10**
16:20	
142. RENEWABLE ENERGY XXIII: Marine Bioenergy	**Room 1**
143. HYDRODYNAMICS XII: CFD 4	**Room 2**
144. RENEWABLE ENERGY XV: Wave 3	**Room 3**
145. ADVANCED SHIP TECH VII: Seakeeping & Resist.	**Room 4**
146. HPM IX: Advances in Welding Technology 2	**Room 5**
147. COASTAL XII: Storm Surge & Inundation	**Room 6**
148. SUBSEA, PIPELINES, RISERS XI: System Integrity	**Room 7**
149. GEOTECH X: Construction & Materials	**Room 8**
150. OFFSHORE MECHANICS X: LNG Transport	**Room 9**

Sunday – Thursday	
Author Practice	**Individual session rooms**
On-site Registration	**Lobby**
ISOPE Headquarters	**VIP Lounge**
Proceedings Pickup	**Registration Desk, Lobby**
Committee Meetings	**Executive D , Mezzanine e**

FRIDAY June 22

Find Updates in Program on www.isope.org and www.isope2012.org
Tours: Click on General Information

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ISOPE-2012 Rhodes

The Twenty-second (2012) International Offshore and Polar Engineering Conference

Rhodes, Greece, June 17–22, 2012

This 22nd annual conference features **150** technical and opening general sessions, 1 plenary presentation and 4 keynote presentations with top experts from industry, academia and government. After peer review of the manuscripts selected from 1,250+ abstracts, some **720** peer-reviewed papers will be presented and discussed by researchers, engineers and managers from more than **52** countries.

The conference proceedings of peer-reviewed papers in PDF files will be available in a set of 4 volumes on CD-ROM (4,200 pp. est.) — paginated within each volume — during the conference and later for worldwide post-conference mail order from ISOPE: **ISBN 978-1-880653-94-4; ISSN 1098-6189.**

The number at end of the session title indicates the tentative number of the proceedings volume. Only the changes on titles or authors the Technical Program Committee received in writing before January 19, 2012 are reflected in this program. Final corrections will be updated in the Conference Proceedings of peer-reviewed papers and the Final Program.

All ISOPE publications are indexed by Engineering Index (EI).

SESSION LIST BY TOPICS

OCEAN AND ENERGY INDUSTRY REVIEW (V. 1)

1. OCEAN AND ENERGY INDUSTRY REVIEW—2011 Jupiter

FRONTIER ENERGY, GAS HYDRATES & OCEAN MINING (V. 1)

9. FRONTIER ENERGY I: Clean Energy Room 8
19. FRONTIER ENERGY II: Clean Coal Room 8
29. FRONTIER ENERGY III: Hydrate Fundamental Room 8
39. FRONTIER ENERGY IV: Hydrate Development Room 8
49. FRONTIER ENERGY V: Hydrate Modeling Room 8
80. FRONTIER ENERGY VI:Ocean Mining 1: Minerals Room 9
90. FRONTIER ENERGY VII:Ocean Mining 2: Systems Room 9

RENEWABLE ENERGY (OFFSHORE WIND AND OCEAN) AND ENVIRONMENT (V. 1)

4. RENEWABLE ENERGY I: Wind 1: Foundations 1 Room 3
14. RENEWABLE ENERGY II: Wind 2: Foundations 2 Room 3
24. RENEWABLE ENERGY III: Wind 3: Substructures Room 3
34. RENEWABLE ENERGY IV: Wind 4: Dynamics 1 Room 3
44. RENEWABLE ENERGY V: Wind 5: Floating 1 Room 3
54. RENEWABLE ENERGY VI: Wind 6: Floating 2 Room 3
64. RENEWABLE ENERGY VII: Wind 7: Analysis Tools Room 3
74. RENEWABLE ENERGY VIII: Wind 8: Concepts Room 3
84. RENEWABLE ENERGY IX: Wind 9: Codes & Design Room 3
94. RENEWABLE ENERGY X: Wind 10: Resources Room 3
104. RENEWABLE ENERGY XI: Wind 11: Power 4 Room 3
114. RENEWABLE ENERGY XII: Wind 12: Room 3
124. RENEWABLE ENERGY XIII: Wave 1 Room 3
134. RENEWABLE ENERGY XIV: Wave 2 Room 3
144. RENEWABLE ENERGY XV: Wave 3 Room 3
72. RENEWABLE ENERGY XVI: Wave 4 Room 1
82. RENEWABLE ENERGY XVII: Wave 5 Room 1
92. RENEWABLE ENERGY XVIII: Wave 6: Resources Room 1
102. RENEWABLE ENERGY XIX: Tidal & Current 1 Room 1
112. RENEWABLE ENERGY XX: Tidal & Current 2 Room 1
122. RENEWABLE ENERGY XXI: Tidal & Current 3 Room 1
132. RENEWABLE ENERGY XXII: Thermal Energy Room 1
142. RENEWABLE ENERGY XXIII: Marine Bioenergy Room 1

7. ENVIRONMENT I: Oil Spill and Emission Room 6

17. ENVIRONMENT II: Physical & Chemical Processes	Room 6
27. ENVIRONMENT III: Water & Sediment Qualities	Room 6

OFFSHORE MECHANICS AND HYDRODYNAMICS (V. 1)

40. OFFSHORE MECHANICS I: Floating Dynamics 1	Room 9
50. OFFSHORE MECHANICS II: Floating Dynamics 2	Room 9
60. OFFSHORE MECHANICS III: Systems I	Room 9
70. OFFSHORE MECHANICS IV: Systems II	Room 9
100. OFFSHORE MECHANICS V: Deepwater Installation	Room 9
110. OFFSHORE MECHANICS VI: Design & Installation	Room 9
120. OFFSHORE MECHANICS VII: Moored Structures	Room 9
130. OFFSHORE MECHANICS VIII: FSRU 1	Room 9
140. OFFSHORE MECHANICS IX: FSRU 2	Room 9
150. OFFSHORE MECHANICS X: LNG Transport	Room 9

GEOTECHNICAL ENGINEERING (V. 2)

59. GEOTECH I: Suction Piles	Room 8
69. GEOTECH II: Offshore Foundations	Room 8
79. GEOTECH III: Soil Improvement	Room 8
89. GEOTECH IV: Cyclic Loading	Room 8
99. GEOTECH V: Slope Stability	Room 8
109. GEOTECH VI: Piles & Foundations	Room 8
119. GEOTECH VII: Consolidation & Seepage	Room 8
129. GEOTECH VIII: Material Testing	Room 8
139. GEOTECH IX: Soil Properties	Room 8
149. GEOTECH X: Construction & Materials	Room 8

SUBSEA, PIPELINES AND RISERS (V. 2)

PLENARY: PNG PIPELINE	Room 7
48. SUBSEA, PIPELINES, RISERS I: NORD Stream	Room 7
58. SUBSEA, PIPELINES, RISERS II: New Concept Development	Room 7
68. SUBSEA, PIPELINES, RISERS III: Panel	Room 7
78. SUBSEA, PIPELINES, RISERS IV: Improved Perform.	Room 7
88. SUBSEA, PIPELINES, RISERS V: Component Develop	Room 7
98. SUBSEA, PIPELINES, RISERS VI: Fatigue Assessment	Room 7
108. SUBSEA, PIPELINES, RISERS VII: Adv Analysis 1	Room 7
118. SUBSEA, PIPELINES, RISERS VIII: Install. & Fabric	Room 7
128. SUBSEA, PIPELINES, RISERS IX: Analysis 2	Room 7
138. SUBSEA, PIPELINES, RISERS X: Flow Effects	Room 7
148. SUBSEA, PIPELINES, RISERS XI: System Integerity	Room 7

UNDERSEA VEHICLE, COMMUNICATION AND CONTROL (V. 2)

11. UNDERSEA I: Operation and Communication 1	Room 10
21. UNDERSEA II: Operation and Communication 2	Room 10
31. UNDERSEA III: Vehicle and Control 1	Room 10
41. UNDERSEA IV: Vehicle and Control 2	Room 10

ARCTIC SCIENCE & TECHNOLOGY (V. 1)

71. ARCTIC I: Navigation in Pack Ice	Room 10
81. ARCTIC II: Ice Mechanics	Room 10
91. ARCTIC III: Coastal Arctic Properties	Room 10
101. ARCTIC IV: Ice Environment & Forecasting	Room 10
121. ARCTIC V: Ice Structure Interaction	Room 10
131. ARCTIC VI: Operations in Ice)	Room 10
141. ARCTIC VII: Ice Modeling & Operations	Room 10

ARCTIC MATERIALS (V. 4)

51. ARCTIC MATERIALS I	Room 10
61. ARCTIC MATERIALS II	Room 10

HYDRODYNAMICS (V. 3)

23. HYDRODYNAMICS I: MetOcean 1	Room 2

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33. HYDRODYNAMICS II: MetOcean 2	Room 2
43. HYDRODYNAMICS III: MetOcean 3	Room 2
53. HYDRODYNAMICS IV: Freak and Long Waves	Room 2
63. HYDRODYNAMICS V: Wave Loading	Room 2
73. HYDRODYNAMICS VI: Floating-Body Dynamics 1	Room 2
83. HYDRODYNAMICS VII: Floating-Body Dynamics 2	Room 2
93. HYDRODYNAMICS VIII: Floating-Body Dynamics 3	Room 2
103. HYDRODYNAMICS XIII: DP & Control	Room 2
113. HYDRODYNAMICS IX: CFD 1	Room 2
123. HYDRODYNAMICS X: CFD 2	Room 2
133. HYDRODYNAMICS XI: CFD 3	Room 2
143. HYDRODYNAMICS XII: CFD 4	Room 2

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5. TSUNAMI I: 2011 Tohoku Tsunami 1	Room 4
15. TSUNAMI II: 2011 Tohoku Tsunami 2	Room 4
25. TSUNAMI III: Generation & Warning 1	Room 4
35. TSUNAMI IV: Generation & Warning 2	Room 4
45. TSUNAMI V: Generation & Warning 3	Room 4
55. TSUNAMI VI: Propagation & Flooding	Room 4
65. TSUNAMI VII: Structure & Sediment 1	Room 4
75. TSUNAMI VIII: Structure & Sediment 2	Room 4
85. TSUNAMI IX: RisK Assessment 1	Room 4
95. TSUNAMI X: Risk Assessment 2	Room 4

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12. LNG SLOSHING II: Physics & Coupling	Room 1
22. LNG SLOSHING III: LNG Tank Design 1	Room 1
32. LNG SLOSHING IV: LNG Tank Design 2	Room 1
42. LNG SLOSHING V: Sloshing Tests	Room 1
52. LNG SLOSHING VI: CFD	Room 1
62. LNG SLOSHING VII: Structural Responses	Room 1
111. LNG SLOSHING VIII: Panel	Room 10

FLOW-INDUCED VIBRATIONS (V. 3)

3. VORTEX-INDUCED VIBRATIONS I	Room 2
13. VORTEX-INDUCED VIBRATIONS II	Room 2

COASTAL HYDRODYNAMICS (V. 3)

37. COASTAL I:Waves & Modeling 1	Room 6
47. COASTAL II: Waves & Modeling 2	Room 6
57. COASTAL III: Waves & Modeling 3	Room 6
67. COASTAL IV: Breakwaters & Waves 1	Room 6
77. COASTAL V: Breakwaters & Waves 2	Room 6
87. COASTAL VI: Breakwaters & Waves 3	Room 6
97. COASTAL VII: Wave-Structure Interaction	Room 6
107. COASTAL VIII: Estuary Hydraulics	Room 6
117. COASTAL IX: Coastal Sediment 1	Room 6
127. COASTAL X: Coastal Sediment 2	Room 6
137. COASTAL XI: Coastal Sediment 3	Room 6
147. COASTAL XII: Storm Surge & Inundation	Room 6

HIGH-PERFORNANCE MATERIALS (V. 4)

66. HPM I: Adv Materials & Structures 1	Room 5
76. HPM II: Adv Materials & Structures 2	Room 5
86. HPM III: Composites	Room 5
96. HPM IV: Fatigue & Fracture 1	Room 5
106. HPM V: Fatigue & Fracture 2	Room 5
116. HPM VI: Fatigue & Fracture 3	Room 5
126. HPM VII: Shipbuilding Steels	Room 5
136. HPM VIII: Advances in Welding Technology 1	Room 5
146. HPM IX: Advances in Welding Technology 2	Room 5

ASSET INTEGRITY (V. 4)

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6. ASSET INTEGRITY I	Room 5
16. ASSET INTEGRITY II	Room 5
26. ASSET INTEGRITY III	Room 5
36. ASSET INTEGRITY IV	Room 5

STRAIN-BASED DESIGN (V. 4)

8. SBD I: Materials	Room 7
18. SBD II: Numerical Modeling	Room 7
28. SBD III: Strain Capacity Characterization	Room 7
38. SBD IV: Fracture Mechanics	Room 7

RISK & RELIABILITY (V. 4)

10. RISK & RELIABILITY I	Room 9
20. RISK & RELIABILITY II	Room 9
30. RISK & FATIGUE	Room 9

ADVANCED SHIP TECHNOLOGY (V. 4)

46. ADVANCED SHIP TECH I: Ultimate Strength	Room 5
56. ADVANCED SHIP TECH II: At-Sea Explosions	Room 5
105. ADVANCED SHIP TECH III: Collision & Vibration	Room 4
115. ADVANCED SHIP TECH IV: Slamming & Load	Room 4
125. ADVANCED SHIP TECH V: Propulsion	Room 4
135. ADVANCED SHIP TECH VI: System design	Room 4
145. ADVANCED SHIP TECH VII: Seakeeping & Resist.	Room 4

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TECHNICAL PROGRAM

The Twenty-second (2012) International Offshore and Polar Engineering Conference

Rhodes, Greece, June 17–22, 2012

The number at end of the session title indicates the tentative number of the proceedings volume. Only the changes on titles or authors the ISOPE-2012 Technical Program Committee (TPC) received in writing before January 19, 2012 are reflected in this program. Final corrections will be updated in the Conference Proceedings of peer-reviewed papers and the Final Program. Conference proceedings (ISBN 978-1-880653-94-4; ISSN 1098-6189) will be available as a set of 4 volumes (4,200 pp. est.) from ISOPE during and after the Conference.
Proceedings papers are **indexed** by **Engineering Index** and Compendex and others.

SUNDAY, June 17
Conference Reception

17:00 Outdoor Pool Garden

TSUNAMI AND SAFETY SYMPOSIUM (V. 3)

5. TSUNAMI I: 2011 Tohoku Tsunami 1 (V. 3)
Monday June 18 10:30 Room 4

Chair: I Nistor, Univ of Ottawa, Canada
Co-Chair: EL Lekkas, Univ of Athens, Greece

Seismic and Acoustic-Gravity Signals from the Source of the 2004 Indian Ocean and the 2011 Japan Tsunami
R Kind, A Raveloson, R Wang, X Yuan, Deutsches GeoForschungsZentrum, Germany

Numerical Simulation of the 2011 Tohoku Tsunami: Comparison with Field Observations and Sensitivity to Model Parameters
ST Grilli, T Tajalibakhsh, JC Harris, Univ of Rhode Island; JT Kirby, FY Shi, Univ of Delaware; T Masterlark, C Kyriakopoulos, Univ of Alabama, USA

The Effect of Rupture Process in an Inverse Analysis on the Tsunami Source of the 2011 off the Pacific Coast of Tohoku Earthquake
T Takagawa, T Tomita, Port and Airport Research Inst, Japan

Applying an Idealized Model to the 11 March 2011 Tohoku Earthquake Tsunami
M Stiassnie, J Tobias, Technion, Israel

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The 2011 Off the Pacific Coast of Tohoku Earthquake Tsunami Observed by GPS Buoys, Seabed Wave Gauges and Coastal Tide Gauges of NOWPHAS on the Japanese Coast
H Kawai, Port and Airport Research Inst; M Satoh, Tohoku Regional Development Bureau; K Kawaguchi, K Seki, Port and Airport Research Inst, Japan

Numerical Analysis of the 2011 Tohoku Tsunami in Tokyo Bay Focusing on High Water Marks in Ports
RU Agung Wiyono, J Sasaki, Yokohama National Univ, Japan

15. TSUNAMI II: 2011 Tohoku Tsunami 2 (V. 3)

Monday June 18 14:00 Room 4

Chair: ST Grilli, Univ of Rhode Island, USA
Co-Chair: M Stiassnie, Technion, Israel

Tsunami Damage in Port of Hachinohe from the 2011 off the Pacific Coast of Tohoku Earthquake
T Tomita, GS Yoem, Port & Airport Research Inst; K Kumagai, National Inst for Land & Infrastructure Mgmt; T Takagawa, K Suzuki, Port & Airport Research Inst; Y Watanabe, National Inst for Land & Infrastructure Mgmt; S Saito, M Sato, Ministry of Land, Infrastructure, Transport & Tourism, Japan

Field Survey of the Tsunami Impact and Loading on Structures - Engineering Lessons of the 2011 Tohoku Tsunami
I Nistor, Univ of Ottawa, Canada; T Shibayama, Waseda Univ, Japan

Inundation and Damage by Run-Up Tsunami of 2011 in the Sendai Plain, Japan
S Arai, A Sibuya, A Aihara, O Takahasi, Tohoku Inst of Tech, Japan

Seabed Environment Damage of Matsushima Bay (Miyagi Prefecture, Japan) after the 2011 Tohoku Earthquake and Tsunami
M Nagao, National Inst of AIST; O Nishimura, Tohoku Univ; K Nishimura, National Inst of AIST; H Sasaki, N Chiba, Tohoku Univ; A Suzuki, National Inst of AIST, Japan

The Mw=9.0 Tohoku Japan Earthquake (March 11, 2011) Tsunami Impact on Structures and Infrastructure
EL Lekkas, E Andreadakis, V Alexoudi, E Kapourani, I Kostaki, Univ of Athens, Greece

Geochemical Survey of Tsunami Sediments and Transport of Toxic Elements from Offshore Environment - Urgent Investigation for Earthquake 2011-3-11
T Komai, Y Kawabe, J Hara, Y Sakamoto, M Zhang, National Inst of AIST, Japan

A Survey on Damage of Small Buildings Due to Liquefaction by the Pacific Coast of Tohoku Earthquake
M Fujii, Tokai Univ; MJ Arai, System Measure; CH Kim, Hokoku Engineering; K Watanabe, Tokai Univ, Japan

25. TSUNAMI III: Generation & Warning 1 (V. 3)

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Monday June 18 16:20 Room 4

Chair: S Tinti, Univ Of Bologna, Italy
Co-Chair: M Fujii, Tokai Univ, Japan

A Laboratory Perspective of Long Wave Generation
N Goseberg, Leibniz Univ Hannover, Germany

On Methodology of Generating a Tsunami-Like Waves in a Wave-Flume Experiment Using a Piston Wavemaker
EV Buldakov, Univ College London, UK

Physical Modelling of Tsunami: A New Technique for Producing N-wave and Its Analytic Verification
T Bagci, S Ozeren, MN Postacioglu, MS Kabdasli, Istanbul Tech Univ, Turkey

SPH Based Simulation of Submarine Slide Triggers
IS Harahap, LM Dakssa, MT Duong, Universiti Teknologi PETRONAS, Malaysia

Tsunami Triggering Mechanisms Associated with the 17th Cent. BC Minoan Eruption of Thera Volcano, Greece
D Sakellariou, G Roussakis, Hellenic Centre for Marine Research; P Nomikou, National & Kapodistrian Univ of Athens, Greece; KL Croff Bell, SN Carey, H Sigurdsson, Univ of Rhode Island, USA

Mathematical Modelling of Tsunami Waves Generated by Bottom Motion on a Non-Uniformly Sloping Beach
A Bandyopadhyay, Khalisani College, India

35. TSUNAMI IV: Generation & Warning 2 (V. 3)

Tuesday June 19 08:00 Room 4

Chair: H Kawai, Port and Airport Research Inst., Japan
Co-Chair: GS Khakimzyanov, Inst of Computational Tech, Russia

Influence of the Heterogeneity of the Seismic Source on the Timely Detectability of a Tsunami: Implications for Tsunami Early Warning in the Central Mediterranean
S Tinti, F Zaniboni, A Armigliato, G Pagnoni, L Bressan, Univ of Bologna, Italy

Numerical Modelling of the 1998 Papua New Guinea Tsunami, Generated by the Quasi-Nonrigid Landslide
SA Beisel, LB Chubarov, Inst of Computational Technologies, RAS, Russia

Geological and Geophysical Investigations - A Background for the Tsunami Early Warning System in the Bulgaria-Romania Black Sea Border Region
BK Ranguelov, Mining & Geology Univ, Bulgaria; G Oaie, R Dimitriu, GEOECOMAR, Romania; O Dimitrov, IO-BAS, Bulgaria

Forecasting Database for the Tsunami Warning Center for the Western Mediterranean and North-East Atlantic Basins
A Gailler, H Hibert, A Loevenbruck, B Hernandez, CEA, France

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The Need for a Decision Support System in Tsunami Early Warning Practice in Case of Near-Shore Sources
S Tinti, A Armigliato, G Pagnoni, F Zaniboni, L Bressan, Univ of Bologna, Italy

Tsunami Early Warning in the Eastern Mediterranean, Aegean and Black Sea
O Necmioglu, N Meral Ozel, Bogazici Univ; AC Yalciner, Middle East Tech Univ; D Kalafat, M Yilmazer, M Comoglu, M Erdik, Bogazici Univ, Turkey

45. TSUNAMI V: Generation & Warning 3 (V. 3)

Tuesday June 19 10:30 Room 4

Chair: V Sundar, IIT Madras, India
Co-Chair: AC Yalciner, Middle East Tech Univ, Turkey

Investigation of the Poro-Elastic Response of Seabed to Tsunami Waves
A Merxhani, DF Liang, Univ of Cambridge, UK

Fully Nonlinear Dispersive Shallow Water Equations on a Rotating Sphere
GS Khakimzyanov, ZI Fedotova, Inst of Computational Technologies, RAS, Russia

Calculations of Wave Run-Up on Cylinder in Multi-Directional Focused Wave
JX Li, ZH Wang, SX Liu, Dalian Univ of Tech, China

Resonant Long-Wave Run-Up on a Plane Beach
T Stefanakis, France; F Dias, Univ College Dublin, Ireland; D Dutykh, Univ de Savoie, France

Field Survey of the 27 February 2010 Chile Tsunami
N Kalligeris, Tech Univ of Crete, Greece; HM Fritz, Georgia Inst of Tech, USA; CE Synolakis, Hellenic Center for Marine Research, Greece; R Weiss, Texas A&M Univ, USA

Tsunami Wave Runup on the Clustered Islands using Boussinesq-type Model
JM Chen, Univ of Cambridge, UK

Sensitivity Analysis of a 2DH Model for Flood Wave Propagation over Dry Land
C Koutitas, M Gousidou, Aristotle Univ of Thessaloniki, Greece

Doppler Effect on Tsunami due to Tidal Amphidromes
K Murali, IIT Madras, India; MR Behera, National Univ of Singapore, Singapore; V Sundar, IIT Madras, India

55. TSUNAMI VI: Propagation & Flooding (V. 3)

Tuesday June 19 14:00 Room 4

Chair: ST Grilli, Univ of Rhode Island, USA

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Co-Chair: K Murali, IIT Madras, India

NEMO-SN1 (Western Ionian Sea, off Eastern Sicily): A Cabled Abyssal Observatory with Tsunami Early Warning Capability
F Chierici, INAF-IRA; P Favali, L Beranzoli, A De Santis, D Embriaco, G Giovanetti, G Marinaro, S Monna, INGV, L Pignagnoli, CNR-ISMAR; G Riccobene, INFN; F Bruni, F Gasparoni, Tecnomare, Italy

Analytical Solutions for Landslide Tsunami Generation and Propagation in Inclined Canyons
I Didenkulova, Tallinn Univ of Tech, Estonia; E Pelinovsky, Inst of Applied Physics, Russia

Numerical Simulation of Long Wave Propagation and Run-Up Using a Lattice Boltzmann Approach on GPGPU Hardware
C Janssen, ST Grilli, Univ of Rhode Island, USA; M Krafcyzk, TU Braunschweig, Germany

Numerical Simulation of Surface Water Waves due to Submarine Landslide Moving over a Spatially Irregular Slope
GS Khakimzyanov, SA Beisel, LB Chubarov, NY Shokina, Inst of Computational Technologies, RAS, Russia

Numerical Simulation of Tsunami Propagation with Corrected Dispersion Effects in Ocean
YS Cho, KW Park, TM Ha, YI Moon, Hanyang Univ, Korea

Application of SEC-HY21 Model on Tsunami Simulations
MC Chiou, CP Ko, CA Hsu, CS Kung, Sinotech Engineering Consultant, Taiwan, China

65. TSUNAMI VII: Structure & Sediment 1 (V. 3)

Tuesday June 19 16:20 Room 4

Chair: PF Filianoti, Univ Mediterranea di Reggio Calabria; Italy
Co-Chair: YS Cho, Hanyang Univ, Korea

Evaluation of Anchored Ship Motion under Tsunami Attack
R Ohta, E Kobayashi, Kobe Univ; S Koshimura, Tohoku Univ; M Murayama, Toyama National College of Tech, Japan

Impact of Tsunami Forces on Near-shore Buildings - Design and Analysis
I Nistor, D Palermo, Univ of Ottawa, Canada

Investigation into Structural Displacement due to Initial Tsunami Forces: Developing a Performance Based Tsunami Engineering Model
R Collins, AG Bloodworth, D Stagonas, Univ of Southampton, UK

Realistic Simulation of Tsunami Induced Flooding and Associated Fluid-Structure Interaction Using the ESI Group VPS Suite of Codes
A Kamoulakos, ESI Group, France; P Groenenboom, ESI Group Netherlands, Netherlands; S Vlachoutsis, J Ramos, ESI Group, France

Comparison of the Effects of Permeable, Impermeable and Monolithic Vertical Surfaces Submerged Breakwaters on Tsunami Run-up Height

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E Irtem, Balikesir Univ; E Seyfioglu, Aralik Univ; S Kabdasli, Istanbul Tech Univ, Turkey

The Investigation of Cylindrical Weir Effects on the Tsunami Inundation Flow around Structure
I Wijatmiko, K Murakami, Univ of Miyazaki, Japan

Influence of a Tsunami Wave on a Wave Power Plant
LE Sjokvist, M Rahm, M Leijon, Uppsala Univ, Sweden

75. TSUNAMI VIII: Structure & Sediment 2 (V. 3)

Wednesday June 20 08:00 Room 4

Chair: H Krogstad, NTNU, Norway
Co-Chair: R Collins, Univ of Southampton, UK

Fully Nonlinear Investigation of Tsunami Impact on Structures
QW Ma, S Yan, City Univ London, UK

The Solitary Wave Loads on Submerged Breakwaters: Laboratory Tests
PF Filianoti, Uni Mediterranea di Reggio Calabria; M Di Risio, Univ dell'Aquila, Italy

Hydrodynamic Loads on Jackup Legs Due to Oceanic Internal Waves
SK Lee, DG Yan, ABS, USA

An Experimental Study on Tsunami Induced Sediment Cloud
A Koroglu, SM Kabdasli, Istanbul Tech Univ; E Irtem, Balikesir Univ, Turkey

Influence of Gel Times on Permeability and Efficacy of Ground Improved by Chemical Grouting Method
T Sasaki, Kyokado Engineering; N Suemasa, Tokyo City Univ; S Shimada, Kyokado Co; T Oyama, Kyokado Engineering, Japan

Improvement of Prediction Models of the Toe Scour of a Seawall and the Topographical Change of a Wide Coastal Area due to Tsunami
K Nariyoshi, Y Yamamoto, S Ishii, Tokai Univ, Japan

85. TSUNAMI IX: Risk Assessment 1 (V. 3)

Wednesday June 20 10:30 Room 4

Chair: C Synolakis, Univ of Southern California, USA
Co-Chair: R Nagaosa, National Inst of AIST, Japan

Probable Maximum Tsunami along the Dutch Coastline
J Dababneh, B Ferguson, D Barton, Paul C Rizzo Associates, USA

Aegean Sea Vulnerability Maps due to Tsunamis Generated by Underwater Landslides
TV Karambas, Aristotle Univ of Thessaloniki; T Hasiotis, Univ of the Aegean, Greece

Tsunami Analysis for Southern Aegean Sea
O Yaprak, Univ of Hawaii, USA; AC Yalciner, METU, Turkey

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New Tsunami Intensity Scale 2012
EL Lekkas, E Andreadakis, I Kostaki, E Kapourani, Univ of Athen, Greece

Marine and Coastal Sustainable Management: A Mitigation Tool to Tsunami Disaster
L Touchant, Univ of Western Ontario, Canada

Tsunami Hazard Risk of a Future Volcanic Eruption of Kolumbo Submarine Volcano, NE of Santorini Caldera, Greece
P Nomikou, Univ of Athen, Greece; S Carey, Univ of Rhode Island, USA; D Papanikolaou, Univ of Athens, Greece; K Croff Bell, Univ of Rhode Island, USA; K Bejelou, Univ of Athens; M Alexandri, Hellenic Centre for Marine Research, Greece; K Cantner, Univ of Rhode Island, USA

95. TSUNAMI X: Risk Assessment 2 (V. 3)

Wednesday June 20 14:00 Room 4

Chair: WC Yang, Taiwan Ocean Research Inst, Taiwan, China
Co-Chair: TV Karambas, Aristotle Univ of Thessaloniki, Greece

Probably Maximum Tsunami due to an Earthquake in the Makran Subduction Zone
AA Dababneh, BK Ferguson, DJ Barton, Rizzo Associates, USA

NEARToWARN: A Proposal for Near-field Tsunamis in the Mediterranean Sea - Potential Assessment, Early Warning & Risk Mitigation
GA Papadopoulos, National Observatory of Athens, Greece

Far-Field Tsunami Hazard of the Potential Flank Collapse of the Cumbre Vieja Volcano
JC Harris, ST Grilli, Univ of Rhode Island, USA; S Abadie, Univ de Pau et des Pays de l'Adour, France

Tsunamis Monitor and Simulate Observation
WC Yang, CC Wu, JM Liau, Taiwan Ocean Research Inst, Taiwan, China

Attempting to Avert a Tsunami Catastrophe, the US National Tsunami Hazard Program Tsunami Ready Initiative in Puerto Rico
WR Diaz, Univ of Texas-Pan American; C von Hillebrandt-Andrade, V Huerfano, Univ of Puerto Rico-Mayaguez, USA

Tsunami Risk and Vulnerability Analysis for the City of Rhodes
ET Flouri, FORTH; DA Mitsoudis, ACMAC; N Chrysoulakis, FORTH; CE Synolakis, Hellenic Center for Marine Research, Greece

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