

OCEAN
NETWORKS
CANADA

BARKLEY CANYON RESEARCH WORKING GROUP – UPDATES AND OUTCOMES

Fabio De Leo,

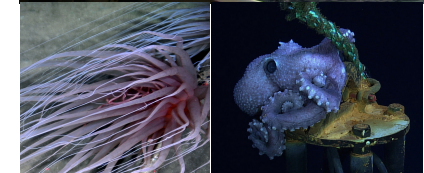
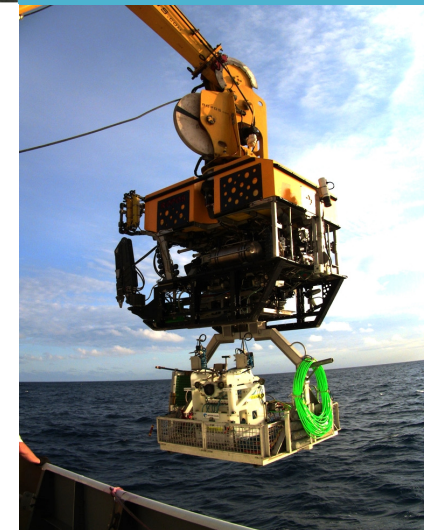
Senior Staff Scientist, Ocean Networks Canada

Adjunct Professor, Department of Biology

University of Victoria

ONC Observatory Council Meeting

Sept 12, 2018



University
of Victoria

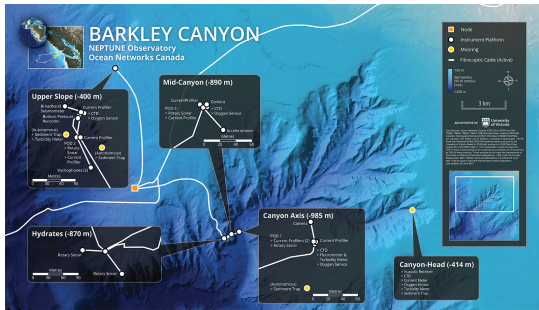


AN INITIATIVE OF



University
of Victoria

Barkley Canyon Science User Communities



Rich Thompson
Susan Allen
Kim Juniper
Francis Juanes
Vera Pospelova

Mairi Best
Paul Snelgrove
Anna Metaxas
Alex Hay

Pere Puig
Jacopo Aguzzi
Claudio Lo Iacono
Ruth Durán

Marjolaine Matabos
Daniela Zepilli

Laurenz Thomsen
Autun Purser

Andrew Thurber
Tamara Baumberger

Jeroen Ingels

Craig Smith
Jeff Drazen

Camila Signori
Vivian Pelizari

Pablo Muniz
Natalia Venturini

Pere Masqué
Paul Lavery

Ashley Rowden

PhDs and Masters:

- MS. Maeva Gauthier (1 pub.)
- MS. Katleen Robert (1 pub.)
- PhD. Carolina Doya (2 pub.)
- Ph.D. Neus Campaña-Llovet, MUM (3 pub.)
- Ph.D. Renald Balley (2 pub.)
- Ph.D. Pauline Chauvet, (2 pub.)
- Ph.D. Sara Seabrook (1 pub., 1 draft)
- Ph.D. Damianos Chatzievangelou (1 pub., 1 draft)
- MS. Marco Francescangeli, ICM (ongoing)

Main PIs (up to 2013)

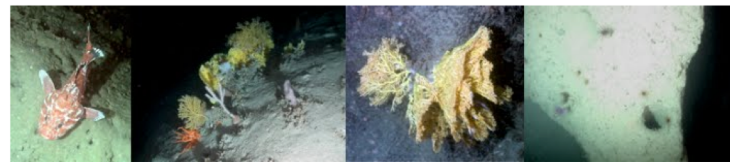
New users (starting in 2014)

Engaging in writing proposals

ONC connected with the INCISE, International Network for submarine Canyon Invigation and Scientific Exchange since 2014

INCISE2014

[ABSTRACTS](#) [PROGRAMME](#) [PRESENTATIONS](#) [SPONSORS](#) [VENUE](#)



The
2nd International Symposium
on Submarine Canyons

29th September–1st October 2014

Hosted by the British Geological Survey,
Edinburgh (UK)



ONC hosted the meeting

OCEAN NETWORKS CANADA

INCISE

3rd INCISE International Submarine Canyon Symposium

25-27 July 2016 Victoria, BC Canada

Home Program Agenda Keynote Speakers Registration Abstracts Travel & Accommodations Venue Vancouver Island Sponsors



ONC will co-sponsor

4th International Submarine Canyon Symposium (INCISE2018)

5-7 November 2018, Shenzhen, CHINA

INCISE

SUSTech

UNIVERSITY OF QUEENSLAND

Home Abstract Programme Travel&Accommodations Venue Registration Sponsors Contact Sign In

ARTICLE IN PRESS

Progress in Oceanography xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Progress in Oceanography

journal homepage: www.elsevier.com/locate/pocean

Review

Bridging the gap between the shallow and deep oceans: The key role of submarine canyons

Fabio C. De Leo^{a,b,*}, Pere Puig^{c,*}^a Ocean Networks Canada, University of Victoria, Canada, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada^b Department of Biology, University of Victoria, Canada, PO Box 3080, Victoria, BC V8W 2Y2, Canada^c Department of Marine Geosciences, Marine Sciences Institute (ICM-CSIC), Barcelona 08003, Spain

4. Benthic and suprabenthic communities and pelagic-benthic coupling

Three contributions in the special volume investigate Barkley Canyon, in the Canadian Pacific incising the Cascadia Margin off Vancouver Island. Barkley Canyon has been recently the subject of an increase in research interests after the installation in 2009 of the NEPTUNE cabled observatory (Barnes et al., 2010; De Leo et al., in press, this volume). With nearly unlimited power supply and high fiber-optic bandwidth, near real time data on seafloor benthos and co-located ancillary oceanographic variables became freely available to the scientific community at large (<https://data.oceannetworks.ca/DataSearch?location=BAC>). The observatory node and seafloor instrumentation in Barkley Canyon allowed for previously logistically unfeasible long-term and high-frequency observations of canyon seafloor and water column habitats in relation to environmental fluctuation; from diel, tidal, seasonal, to inter-annual and decadal scales (Juniper et al., 2013; Doya et al., 2014; Thomsen et al., 2017). In Chauvet et al., in press, annual and seasonal variability in megabenthic community composition are investigated based on seafloor video imagery and essential oceanographic variables such bottom temperature, salinity, dissolved oxygen and current velocities. In addition, the effects of sea surface climatology including the variability of temperature, wave height and primary productivity are discussed as potential drivers of deep seafloor benthic community structure. Campanyà-Llovet et al., in press investigate a range of sedimentary and near bottom water biogeochemical proxies in a depth gradient along Barkley Canyon, and discuss the sources (i.e., macroalgae, phytoplankton, zooplankton; resuspended sediments) and degradation states of organic matter reaching the seafloor, and their role in structuring the macrobenthic infaunal communities. De Leo et al., in press report on a 20-month time-series of seafloor video imagery, acoustic Doppler backscatter and current profiling, witnessing for the first time the exact onset timing of the seasonal and deep overwintering migration of *Neocalanus* spp. copepods. The authors, who also use ground-truth zooplankton net cast data from available long-term hydrographic time-series in the Barkley Canyon area, propose a conceptual model where the vertical current profile structure in the canyon axis acts to focus the deep zooplankton biomass near the core of its overwintering depth. Their conceptual model is corroborated by the results from the aforementioned article by Campanyà-Llovet et al., in press, which reports high concentrations of zooplankton lipid biomarkers at the same depths (~1000 m) in Barkley



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Progress in Oceanography

journal homepage: www.elsevier.com/locate/pocean

Annual and seasonal dynamics of deep-sea megafaunal epibenthic communities in Barkley Canyon (British Columbia, Canada): A response to climatology, surface productivity and benthic boundary layer variation

Pauline Chauvet^{a,*}, Anna Metaxas^b, Alex E. Hay^b, Marjolaine Matabos^a^a Ifremer Centre de Bretagne, REM/EEP, Laboratoire Environnement Profond, 29280 Plouzané, France^b Department of Oceanography, Dalhousie University, Halifax, NS B3H 4R2, Canada

Contents lists available at ScienceDirect

Progress in Oceanography

journal homepage: www.elsevier.com/locate/pocean

Food quantity and quality in Barkley Canyon (NE Pacific) and its influence on macroinfaunal community structure

Neus Campanyà-Llovet^{a,b,*}, Paul V.R. Snelgrove^{b,a}, Fabio C. De Leo^{c,d}^a Biology Department, Memorial University of Newfoundland, St. John's, NL A1B 3X9, Canada^b Department of Ocean Sciences, Memorial University of Newfoundland, St. John's, NL A1C 5S7, Canada^c Ocean Networks Canada, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada^d Department of Biology, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada

Contents lists available at ScienceDirect

Progress in Oceanography

journal homepage: www.elsevier.com/locate/poceanHigh-frequency observations from a deep-sea cabled observatory reveal seasonal overwintering of *Neocalanus* spp. in Barkley Canyon, NE Pacific: Insights into particulate organic carbon fluxFabio Cabrera De Leo^{a,b,*}, Bruno Ogata^{b,c}, Akash R. Sastri^{a,b}, Martin Heesemann^{a,d}, Steven Mihály^{b,c}, Moira Galbraith^e, Michael G. Morley^a^a Ocean Networks Canada, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada^b Department of Biology, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada^c Biosciences Institute, São Paulo State University (UNESP), Coastal Campus, Praça Infante Dom Henrique s/n, São Vicente, SP 11330-900, Brazil^d School of Earth and Ocean Sciences, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada^e Institute of Ocean Sciences, Department of Fisheries and Oceans, 9860 W Saanich Rd, Sidney, BC V8L 5T5, Canada



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Progress in Oceanography

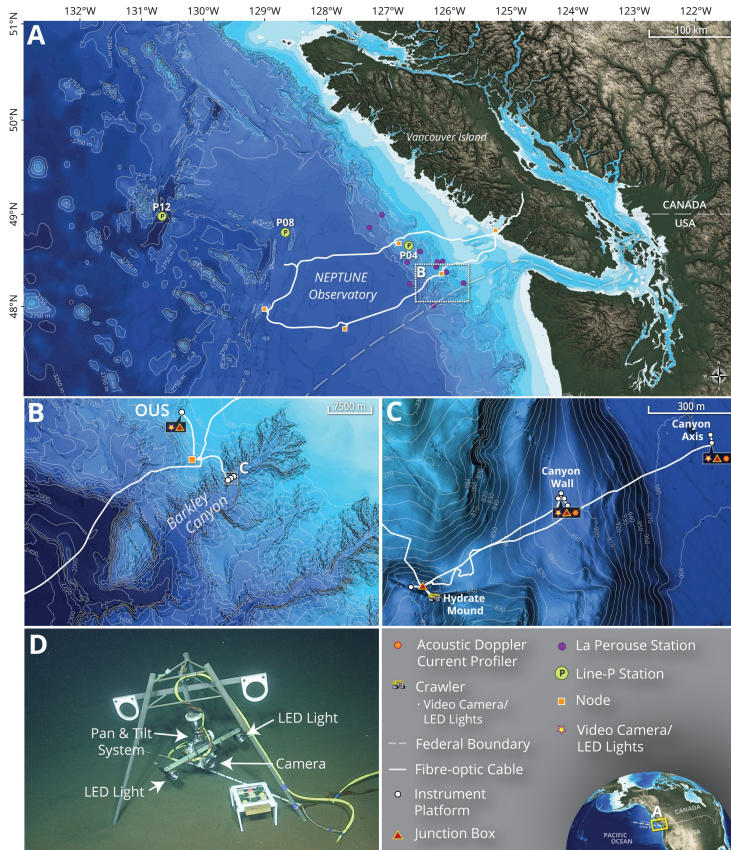
journal homepage: www.elsevier.com/locate/pocean



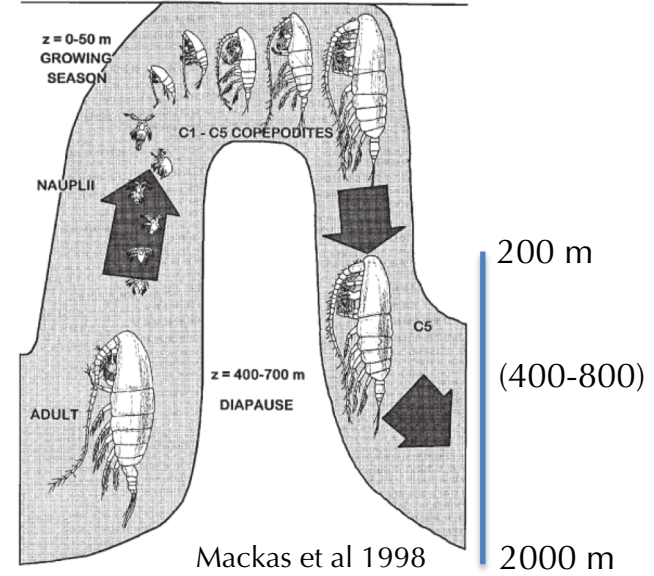
High-frequency observations from a deep-sea cabled observatory reveal seasonal overwintering of *Neocalanus* spp. in Barkley Canyon, NE Pacific: Insights into particulate organic carbon flux

Fabio Cabrera De Leo^{a,b,*}, Bruno Ogata^{b,c}, Akash R. Sastri^{a,b}, Martin Heesemann^{a,d}, Steven Mihály^{a,e}, Moira Galbraith^e, Michael G. Morley^a

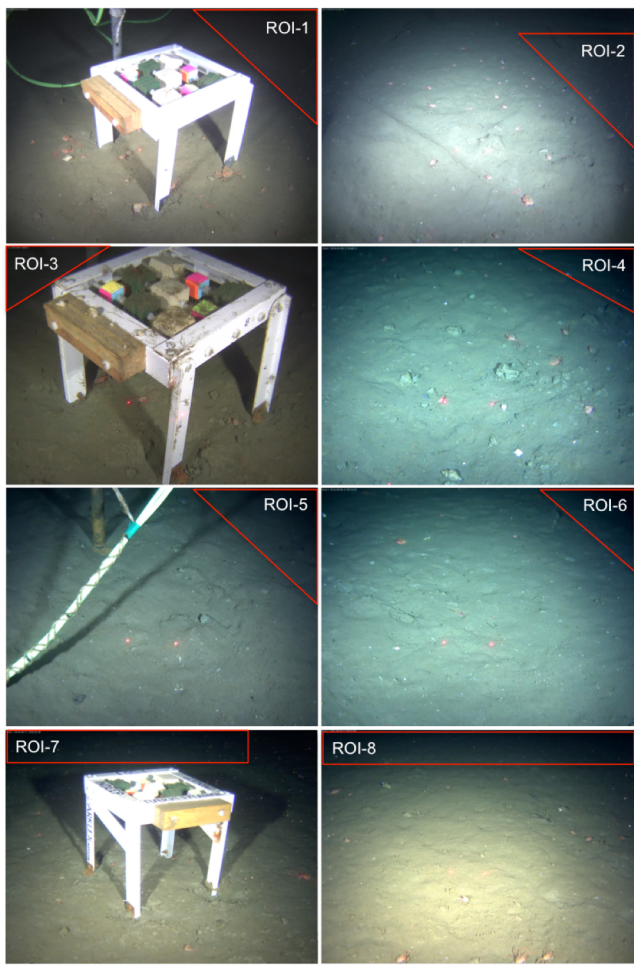
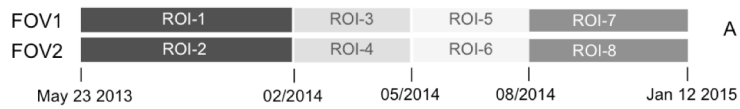
^a Ocean Networks Canada, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada
^b Department of Biology, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada
^c Biosciences Institute, São Paulo State University (UNESP), Coastal Campus, Praça Infante Dom Henrique s/n, São Vicente, SP 11330-900, Brazil
^d School of Earth and Ocean Sciences, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada
^e Institute of Ocean Sciences, Department of Fisheries and Oceans, 9860 W Saanich Rd, Sidney, BC V8L 5T5, Canada



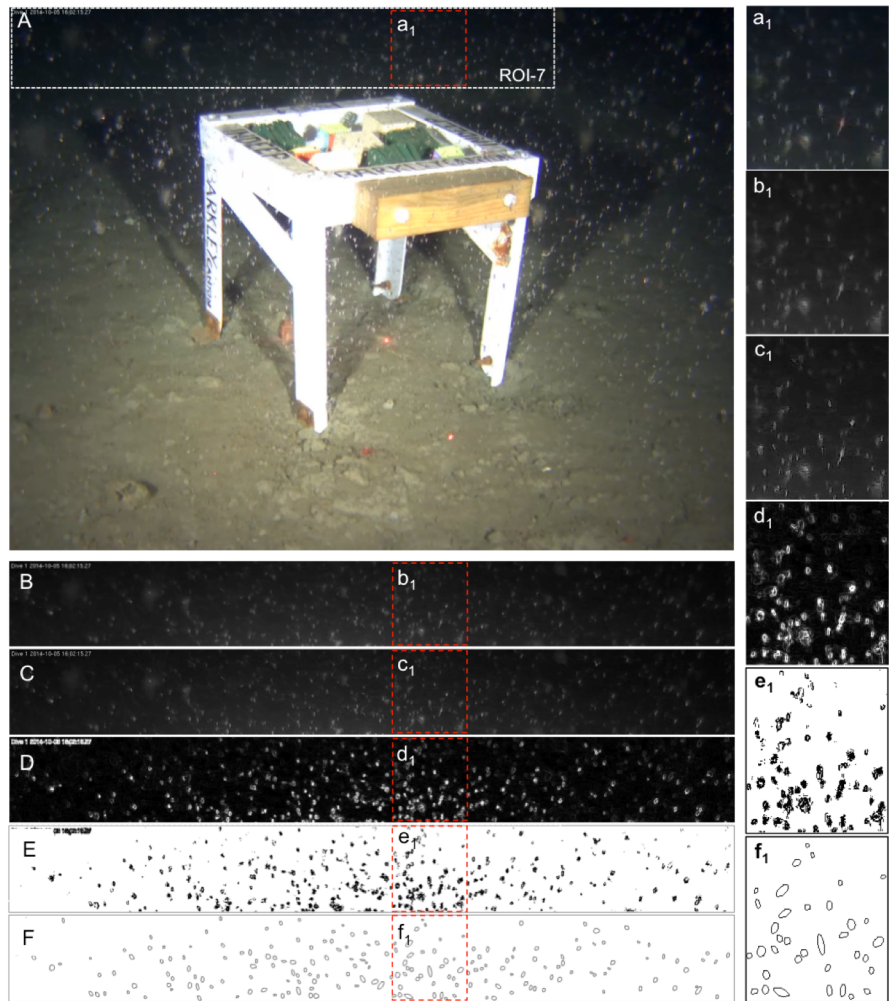
WINTER SPRING-EARLY SUMMER LATE SUMMER-AUTUMN



Mackas et al 1998



B





Contents lists available at ScienceDirect

Progress in Oceanography

journal homepage: www.elsevier.com/locate/pocean



High-frequency observations from a deep-sea cabled observatory reveal seasonal overwintering of *Neocalanus* spp. in Barkley Canyon, NE Pacific: Insights into particulate organic carbon flux

Fabio Cabrera De Leo^{a,b,*}, Bruno Ogata^{b,c}, Akash R. Sastri^{a,b}, Martin Heesemann^{a,d}, Steven Mihály^{a,e}, Moira Galbraith^e, Michael G. Morley^b

^a Ocean Networks Canada, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada

^b Department of Biology, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada

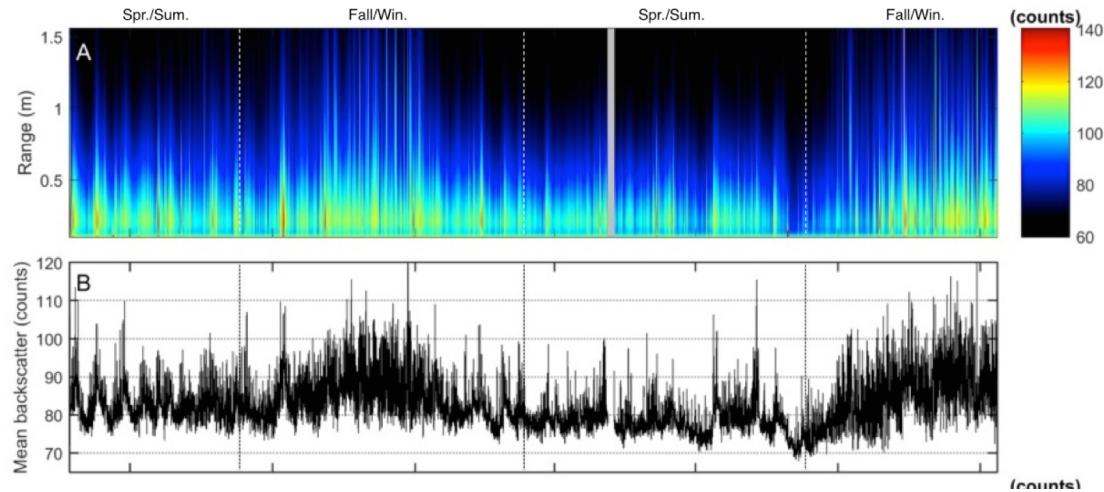
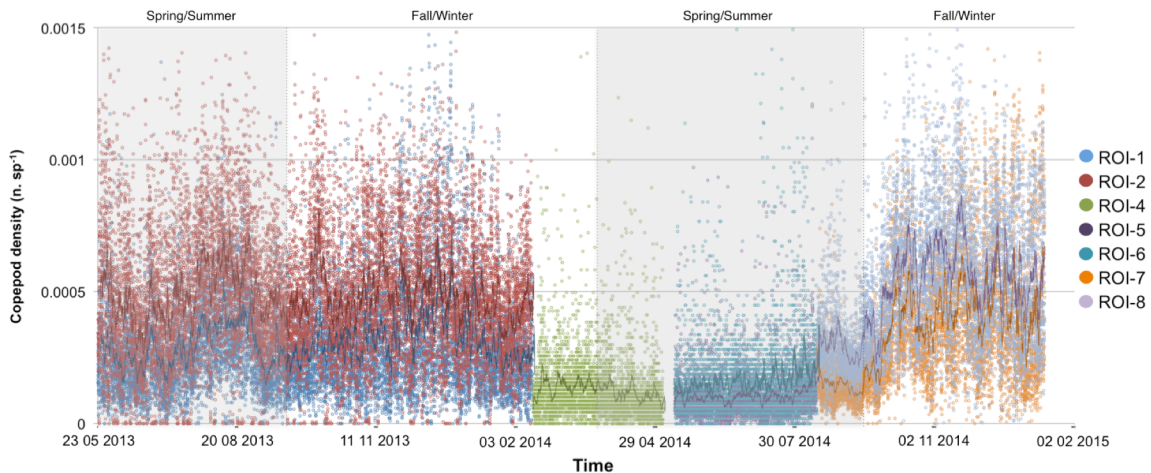
^c Biosciences Institute, São Paulo State University (UNESP), Coastal Campus, Praça Infante Dom Henrique s/n, São Vicente, SP 11330-900, Brazil

^d School of Earth and Ocean Sciences, University of Victoria, PO Box 3080, Victoria, BC V8W 2Y2, Canada

^e Institute of Ocean Sciences, Department of Fisheries and Oceans, 9860 W Saanich Rd, Sidney, BC V8L 5T5, Canada

Video

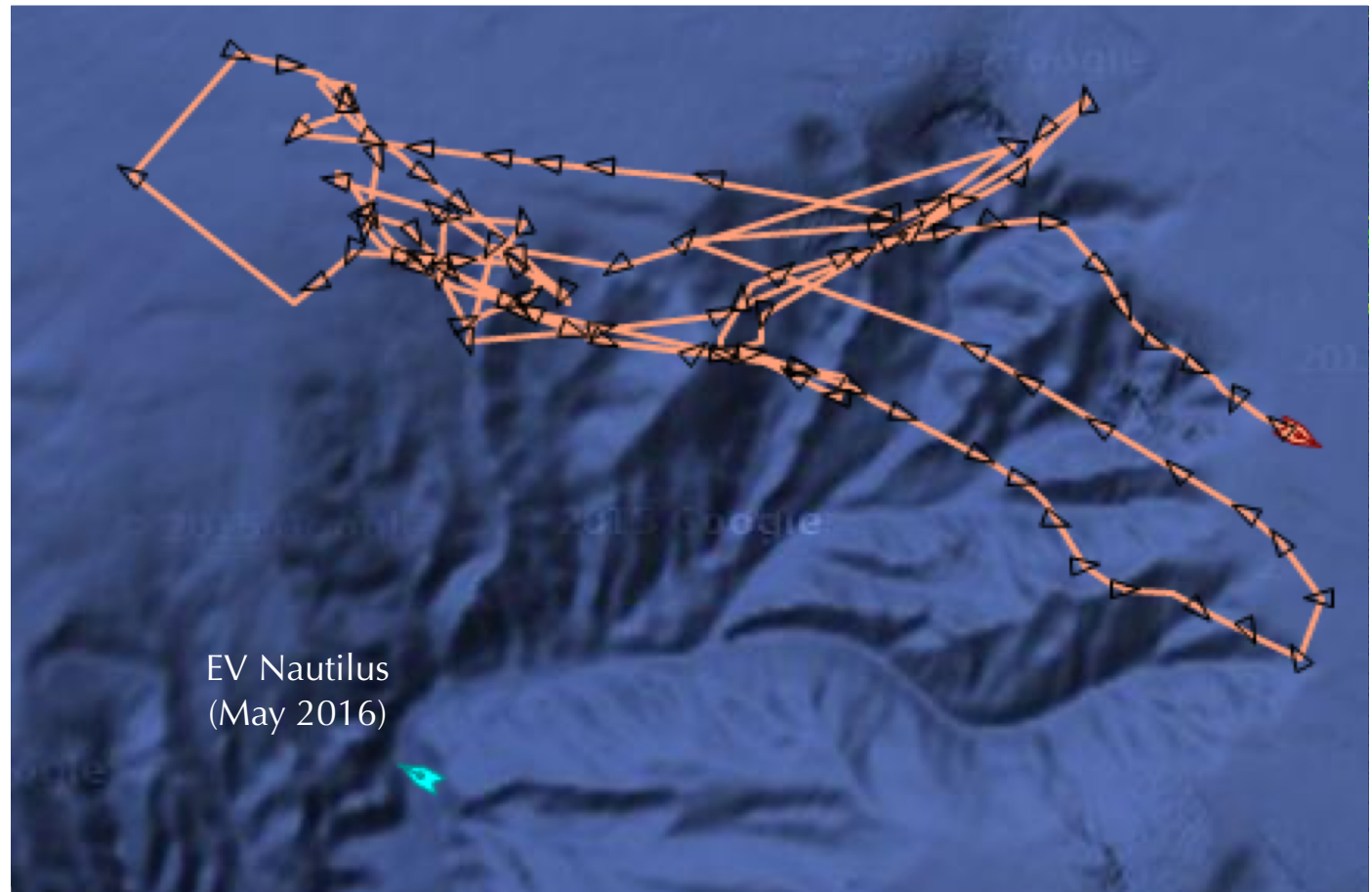
2 MHz ADCP



Bottom trawling fishing in Barkley Canyon

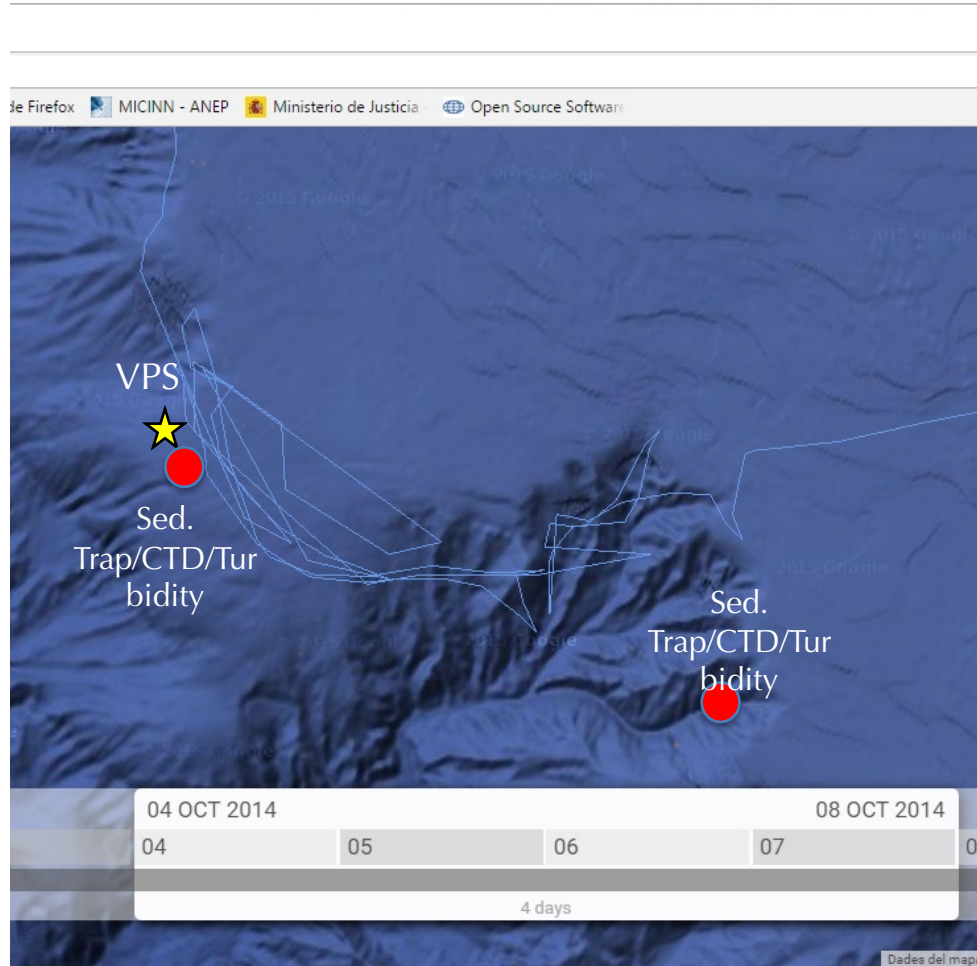
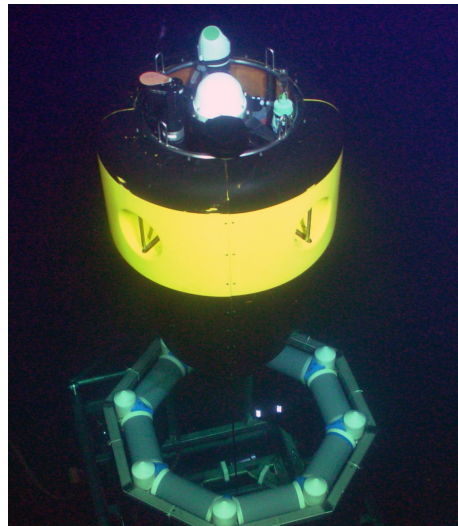
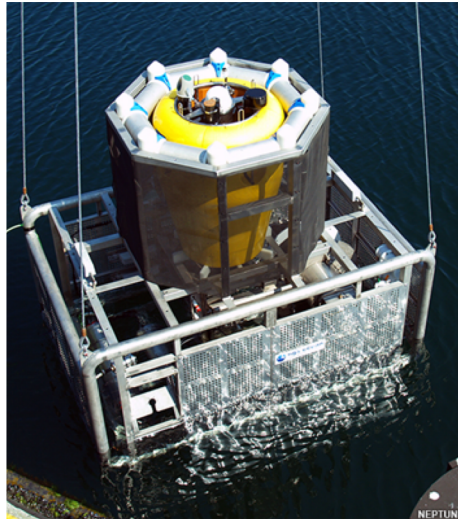
Deep-water fishing: Slopes and Submarine Canyons (British Columbia)

Use of AIS
(Automated
Information
System)
transponders
from vessels to
assess spatial
distributions of
trawling (2)

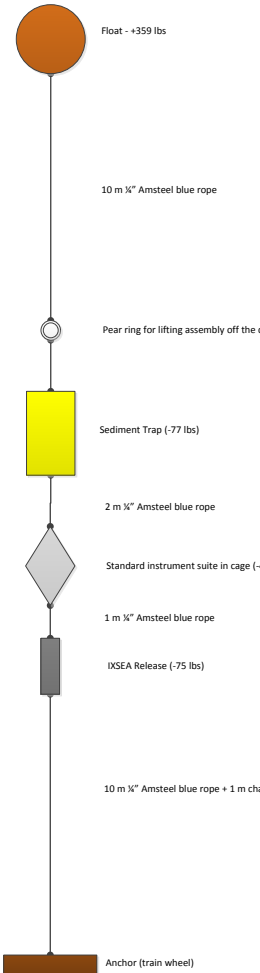


Bottom trawling fishing in Barkley Canyon

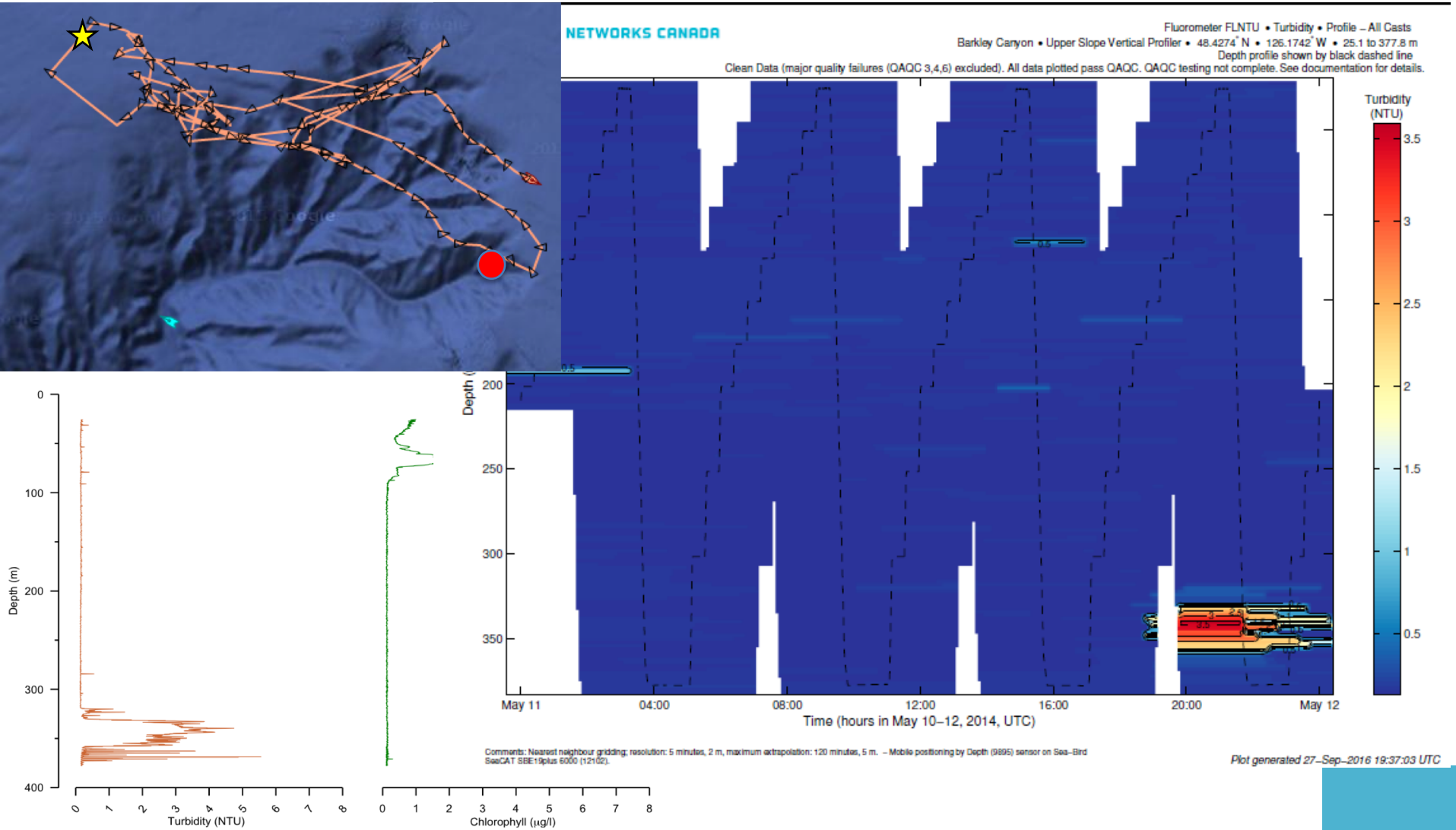
Deep-water fishing: Slopes and Submarine Canyons (British Columbia)



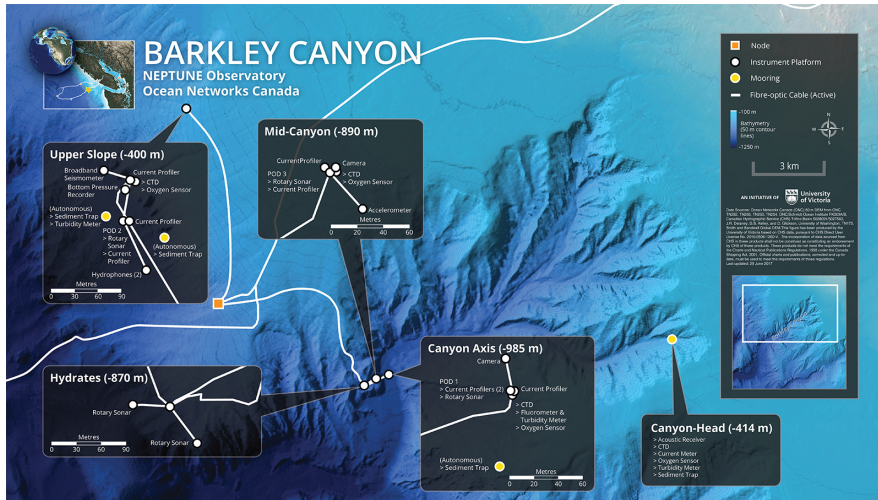
d Mooring



Bottom trawling fishing



New proposals submitted (2/2)



"**HABISS** - Eco-hydrodynamics of cold water coral habitats across integrated spatial scales.

Claudio Lo Iacono, Pere Puig, ICM-CSIC, Barcelona
Marie Curie Actions – Career Restart fellowships
H2020-MSCA-IF-2018 call

- ROV video surveys at Barkley Coral Cliffs
- Autonomous ADCP deployments May-Aug 2013

Ocean Networks Canada Data Search

Oceans 2.0

Logged in as Fabio De Leo | Profile | Help | Logout

Step 1. Choose Data Source | Step 2. Select Data Product | Step 3. View Cart (0 items)

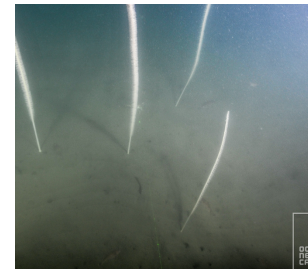
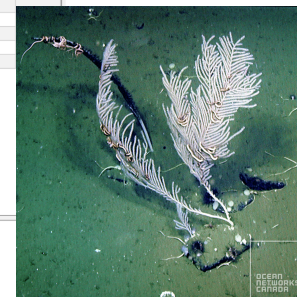
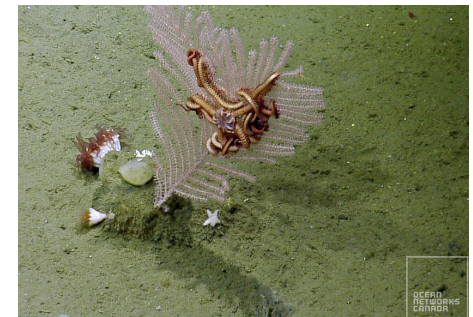
ADCP 2 Mhz
Nortek Aquadopp Profiler AQD 2786 (23163) Details | Documentation

Date From (UTC): 14-May-2013 00:00:00 | All Available | Date To (UTC): 08-Aug-2013 23:59:59 | Reset Time Fields

	23 May 2013	20 Jun 2013	18 Jul 2013	15 Aug 2013	12 Sep 2013	10 Oct 2013	07 Nov 2013
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Magnetic Compass Heading (9826)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pitch (9827)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure (9818)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Roll (9824)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sound Speed (9821)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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NOTE: Most data products have additional Metadata automatically generated and added to the Cart. + Add to Cart

<< Previous | Next >>



Upcoming ONC Theme Leader workshop



Ocean Networks Canada research-theme focused workshop

Main objectives:

“Marine cabled observatories: moving towards applied monitoring for fisheries management, ecosystem functioning and biodiversity”

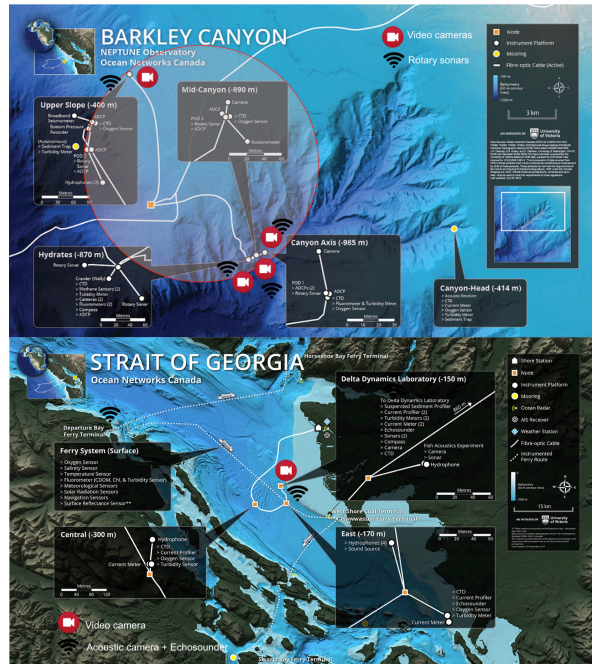
ONC Research Theme: ‘Life in the environments of the NE Pacific and Salish Sea’

- Generate Proof-of-concept papers
- Propose a new experiment in Barkley Canyon
- Engage new expertise related to fisheries monitoring

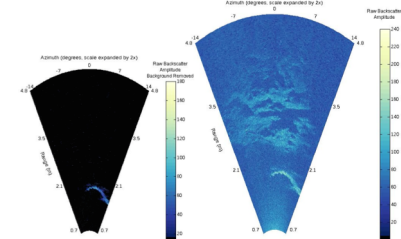
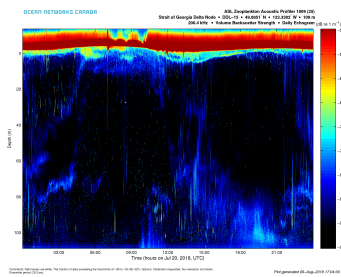
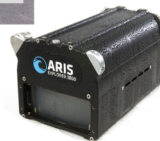
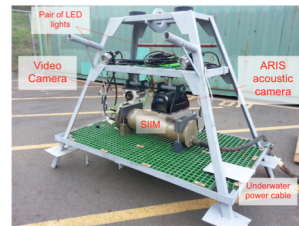
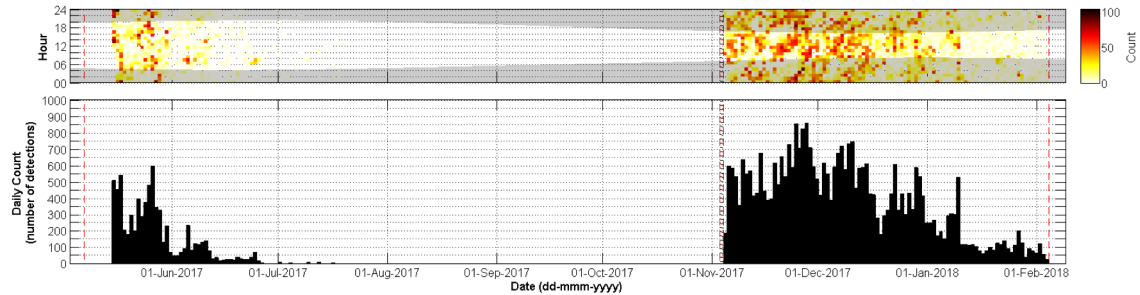
October 4-5, Institute of Marine Sciences, ICM-CSIC, Barcelona, Spain

Organizers:

Dr. Jacopo Aguzzi (ICM-CSIC; Science Theme Leader for ONC)
 Dr. Fabio De Leo (Senior Staff Scientist ONC, Dept. Biology, UVic)



Ocean Networks Canada nodes and monitoring infrastructure in Barkley Canyon, NE Pacific, and Strait of Georgia, Saalish Sea.



Barkley Canyon Research Themes

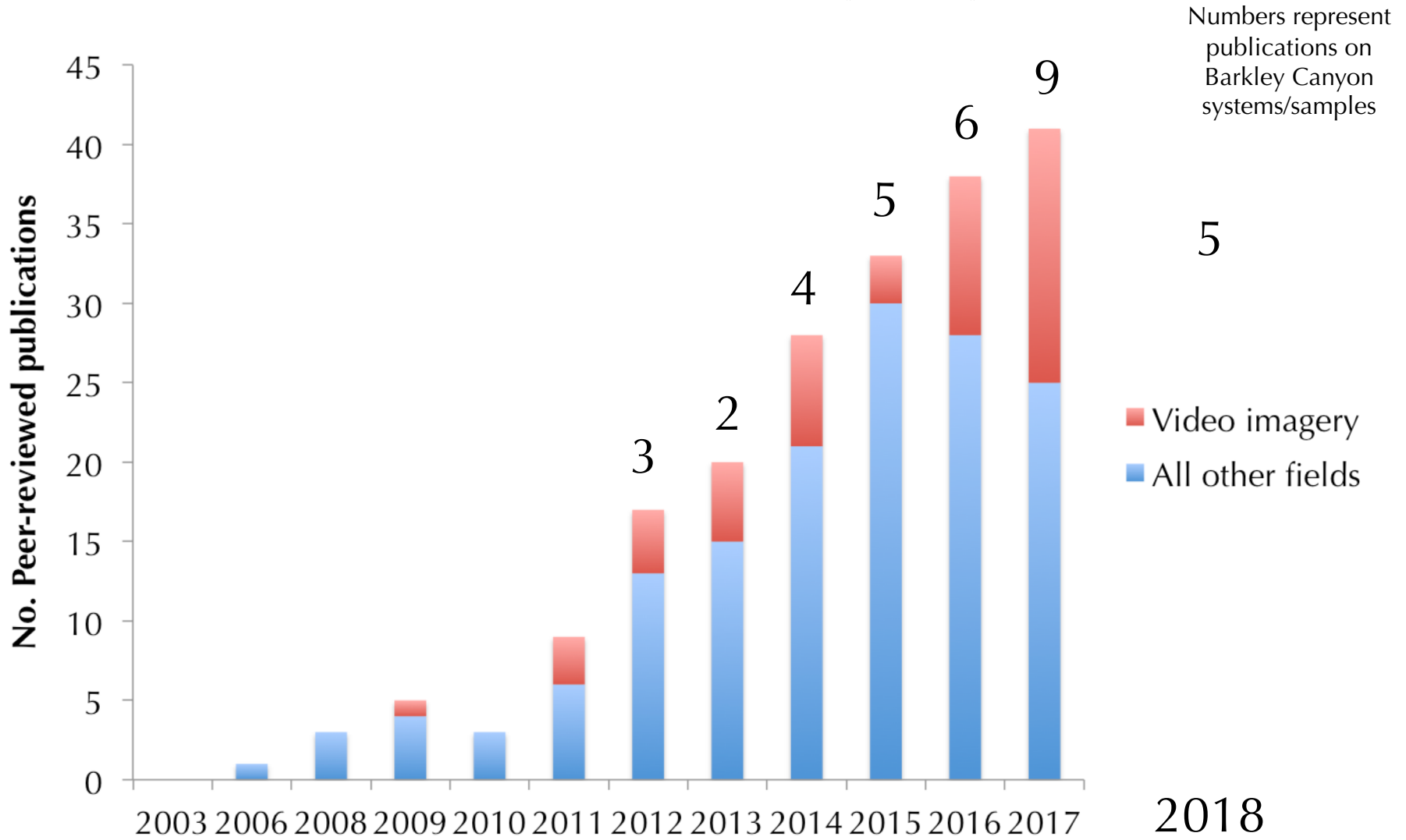
Prior to 2013

- Benthic ecosystem dynamics
(diel, tidal, seasonal dynamics)
- Chronobiology
- Physical Oceanography
- Methane hydrate dynamics
- Pulse-Chase experiments
- Image recognition/computer vision
- **Shorter data-sets**
- **Small emphasis on samples**

2013 to current

- Sediment transport and dynamics
- Organic falls succession dynamics
- Canyon acting as a conduit for organic matter burial (Kelp detritus)
- Use of additional and complimentary data (e.e., MODIS Satellite –ocean color)
- Ontogenetic migration of plankton
- Human impacts – bottom fishing
- **Longer data-sets**
- **Large emphasis on samples**

ONC Publications/Barkley Canyon



Questions for guidance:

- How are we doing in terms of scientific output coming from Barkley Canyon's scientific community?
- Should we engage different research communities which currently are not engaged?