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- Welcome Ian Brunjes, NSF Environmental Data
- **Initiative Intern** lan Brunjes is a master's student at the UCSB Bren School of Environmental Science & Management and

technical skills toward applications of oceanic and environmental science. The first of these efforts is via the NSF Environmental Data Initiative summer fellowship program and working with the SCCOOS team. This summer, he will be contributing to the



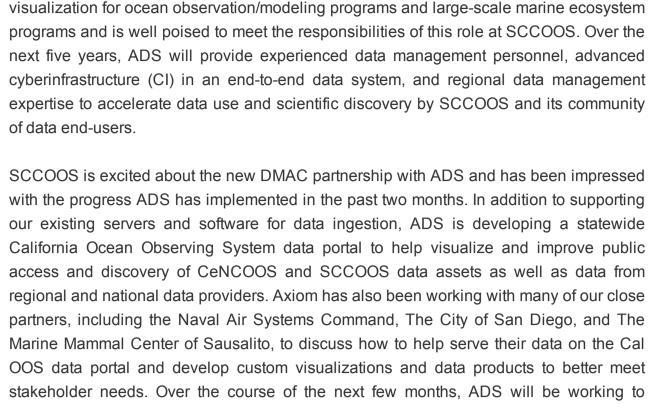
Harmful Algal Bloom Monitoring Alert Program data xiom DATA SCIENCE

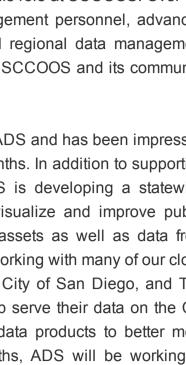
is studying coastal marine resource management, with a focus on data science and data management.

After receiving an undergraduate degree in Computer Science and working seven years as an enterprise

software developer, he is hoping to utilize his

SCCOOS Collaborating with Axiom Data Science SCCOOS is exploring new modalities of operation for its Data Management and Cyberinfrastructure (DMAC) system, which includes a contract with Axiom Data Science (ADS) as the DMAC data provider. As the current provider of DMAC services to several Integrated Ocean Observing System (IOOS) Regional Associations, ADS has demonstrated its expertise in providing data management support services and





Left: Paul Chua, SIO Development Engineer, installing an Imaging FlowCytobot (IFCB) on the Del Mar Mooring three miles offshore. Right: Melissa Carter, SCCOOS PI, deploying an IFCB on the Newport Beach Pier next to SCCOOS Automated Shore Station CTD and Durfet sensors. Excuse the biofouling, it comes with the job! Following the in-person IFCB training at Scripps Institution of Oceanography in March, an Ocean Protection Council (OPC)-funded Imaging FlowCytobot (IFCB) was successfully deployed on the Del Mar mooring on 2-April and is collecting phytoplankton data in realtime. The Newport Beach Pier OPC-funded IFCB was also deployed on 9-July; we anticipate real-time data will be available soon. ADS is serving the IFCB data on our new data portal (coming soon!) and through a prototype national HAB Data Assembly Center hosted by ADS as part of a SCCOOS and ADS led NOAA NCCOS project (PCMHAB20).

(https://sccoos-ifcbdb.srv.axds.co/dashboard). Additionally, as part of the IOOS National Harmful Algal Bloom Observing Network effort, SCCOOS hired Dr. Kasia Kenitz as a dedicated staff member and plankton scientist at SIO to focus on machine-learning methods for classifiers and organizing the CA IFCB team members to prepare for a coordinated and standardized approach to annotating IFCB imagery. A manuscript describing this community effort was recently submitted to Frontiers in Marine Science-

California Underwater Glider Network Mean 10 m Temperature Anomaly а ္စ္ ₂ b 37 1000 36 ⊙³⁵ Pt. Conception -2 1950 9 34 1960 1970 1980 1990 2000 3000 = Latitiv Time

5000

-116

CUGN gliders

1960

Mean 10 m Salinity Anomaly

community data offshore. Many of the IFCBs will be deployed opportunistically on research cruises to help fill the gap in the offshore environment where HAB data are critical for properly validating the C-HARM model output for tracking offshore initiations of blooms. We anticipate all 10 IFCBs will be deployed and collecting data in real-time by

Cortez Ave Descanso Ave.

Palm Avenue Cortez Avenue **Descanso Avenue**



2

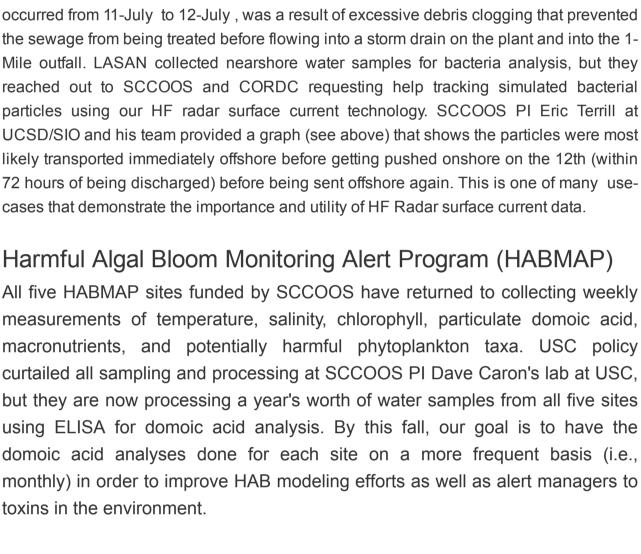
distance to shore [miles]

0.5

Jul 12 00:00

0.5

data. Figure credit: Alli Ho, UCSD/SIO.



NASA DEVELOP - SCCOOS Red Tide Project Accepted for Fall Term SCCOOS-led red tide project titled "Using Remote Sensing to Detect the Frequency and Drivers of Red Tide Blooms in California to Assist in the Management of Human and Marine Exposure to Algal Toxins," was accepted by NASA DEVELOP as one of their fall projects. A team of five students will be working with SCCOOS and our colleagues at Scripps Institution of Oceanography, NASA Jet Propulsion Laboratory, and NASA AMES to better understand the frequency, drivers, and remote detection of red tide blooms in California, specifically Lingulodinium polyedra, which in 2020 reached unprecedented levels in southern California, causing massive mortality of fish and invertebrates as well as widely reported respiratory distress in humans. DEVELOP will partner with the California Office of Environmental Health Hazard Assessment (OEHHA), NOAA Southwest Fisheries Science Center (SWFSC), California Department of Public Health (CDPH), and Scripps Institution of Oceanography (SIO) to monitor the dynamics of algal blooms as they spread to marine habitats and recreational areas by applying various ocean color detection algorithms. The team will utilize Earth observing sensors including GCOM-C, Landsat 8 OLI, Aqua MODIS, Suomi NPP VIIRS, Sentinel-3 OLCI, and DESIS on ISS in conjunction with time-series data collected at Scripps Pier to apply cutting-edge band-ratio algorithms to assess red tide extent relative to in situ 'omics sampling, HABMAP sampling, and automated imaging microscope imagery. Maps highlighting

SERVIN In April, SCCOOS completed our Regional Information Coordination Entity (RICE) Certification Audit that is conducted to ensure SCCOOS is in compliance with the representations made in the certification application and the terms of the certification MOA. The RICE certification is a key milestone to the establishment of the full IOOS system and is mandated in the Integrated Coastal and Ocean Observation System Act of 2009 (ICOOS Act). The Certification means that SCCOOS is providing high-quality observations to National-level standards and extending the reach and ability of Federal programs. Promising Future for IOOS Federal Funding The FY22 President's Budget released in June included an increase of \$29 million that would support the regional coastal observing systems operated by the 11 IOOS Regional Associations. The House and Senate have both begun writing their funding bills that demonstrate their support of the IOOS system. - The House Appropriation Committee provided \$50 million for IOOS Regional Observations in their FY22 draft bill, an increase of \$9.5 million over the FY21 enacted level and the Senate Bill included. The bill also supports the need to enhance the nation's capacity for monitoring and detecting Harmful Algal Blooms.

SCCOOS has co-organized, participated in, and presented at several virtual workshops over the past few months. Meeting agendas, notes, and presentations are available by

Mar 31- Apr 1: Coastal Solutions Workshop: Coastal Flood Modeling, Prediction and

• June 29-30: Regional Ecosystem Services Observation Network (RESON) Worksho

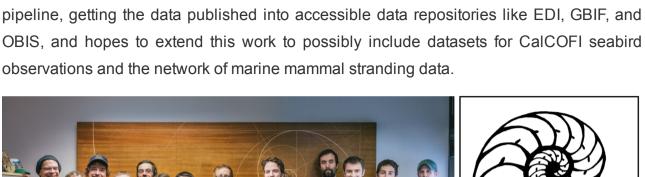
June 17 - West Coast Stakeholder Forum. Video recording is available <u>here</u>.

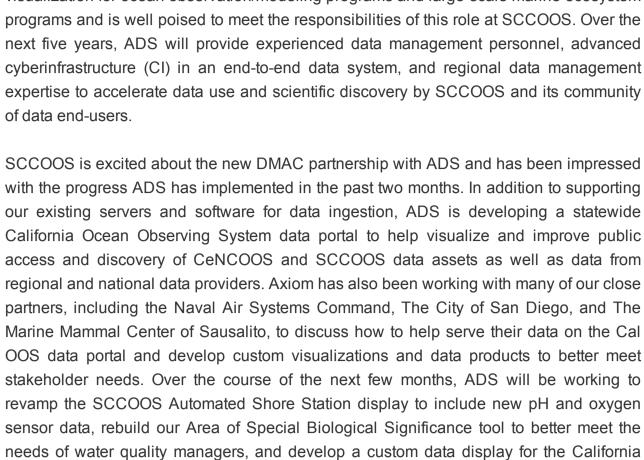
Letters of Intent are due 9-August, 2021

Djavidnia S., Escobar, E., Fietzek P., ... Weatherdon, L. (2021). Enhanced monitoring of life in the sea is a critical component of conservation management and sustainable economic growth. Marine Policy. IOOS Association. (2021). <u>Detecting the Coastal Climate Signal: The IOOS</u> Contribution. IOOSassociation.org. Kahru, M., Anderson, C., Barton, A.D., Carter, M.L., Catlett, D., Send, U., Sosik, H.M.,

(2021). Marine algal toxins and their vectors in southern California

- inner-shelf flow spatial variability using realistic model experiments with and without

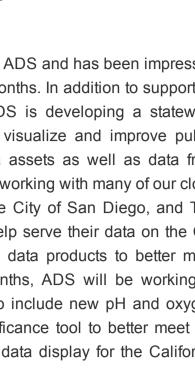




Imaging FlowCytobot (IFCB) Network.

What's New in the Field?

California IFCB Network



To date, five of the network of ten IFCBs are currently deployed along the California coast at Scripps Pier, Del Mar Mooring, Newport Beach Pier, San Francisco Bay, and Santa Cruz Wharf. Upcoming deployments include M1 Mooring, Bodega Marine Laboratory, and Hog Island Oyster Company. The Scripps Pier IFCB, funded by Andrew Allen's NOAA-ECOHAB, was also deployed on the summer CCE-LTER cruise to collect phytoplankton

90.0

Longitude (°)

early fall.

32

31

Methods (Kenitz et al. 2021, in review)

a) Location of the CUGN glider lines 66.7, 80.0, and 90.0 (black). b) The 10 m annual mean temperature anomaly from CalCOFI (blue) and 365-day lowpass filtered temperature anomaly from CUGN (red). c) The 10 m annual mean salinity anomaly from CalCOFI (blue) and 365-day lowpass filtered salinity anomaly from CUGN (red). See Ren and Rudnick, 2021 for full figure caption. This past year, SCCOOS PI Daniel Rudnick at UCSD/SIO completed the calibration of a dissolved oxygen data set using a combination of lab calibrations and comparisons with CalCOFI bottle data, available at spraydata.ucsd.edu. The goal is five sustained lines using Spray underwater gliders off the coast of California. The lines follow the CalCOFI geometry, from south to north: line 90.0 (funded by NOAA GOMO), alongshore at station 60 (SCCOOS), line 80.0 (SCCOOS), line 66.7 (NOAA GOMO), and line 56.7 (CeNCOOS). The COVID-19 pandemic briefly interrupted the observations from March-June 2020, but all lines are up and functioning normally. More information on the California Underwater Glider Network can be found on the SCCOOS website. Recent papers include Ren and Rudnick, 2021 and Takeshira et al. 2021. California Coastal Flood Network

SCCOOS PI Mark Merrifield at UCSD/SIO developed a detailed error analysis and a probabilistic assessment to be included with the website forecasts for Cardiff Beach, Imperial Beach, and Huntington Beach, as described in a manuscript published June 2021 in Natural Hazards. Advanced flood models have been developed for Coronado and Huntington Beach, with additional flood reports needed to finalize flood thresholds. COVID-19 has posed a challenge for collecting data of flood occurrence, particularly at Huntington Beach. In collaboration with CA State Parks, flood forecasts for the Malibu site are in development, using a less site-specific runup model on recently collected California High-Frequency Radar Network

Jul 13 00:00

1.5

Plot of trajected particles from Hyperion's outfall starting on July 12th using HF radar surface current

The City of LA Sanitation and Environment (LASAN) discharged 17 million gallons of sewage out of Hyperion's 1-Mile outfall in July 2021. The overflow discharge, which

days since Jul 11 18:00h

outfall point

Jul 14 00:00

2.5

2.5

0.5

(Upper) South Imperial Beach during a moderate flood on 18 Jan 2020. LiDAR scans of the swash zone were collected from a condominium balcony at the seaward end of Cortez Ave (Arrows). (Middle) Entry points for street flooding include: directly through public access through the berm at Seacoast Dr, over riprap rock at Cortez Ave, and through an access point in the seawall at Palm Plaza. (Lower) Flooding occurs landward of these entry points. Figure from Merrifield et al., 2021.

Additionally, a long-term collaboration with Kerri Danil at NOAA/SWFSC and other marine mammal researchers led to an 18-year synthesis paper by Danil et al., 2021 in Harmful Algae on algal toxins and cetacean exposure for southern California. This research relied on weekly HABMAP cell counts and domoic acid concentrations since 2008. Ship-Based Observations

SCCOOS supports nine nearshore stations along the CalCOFI sampling

transect. CalCOFI was able to resume sampling in 2021 and has completed

SCCOOS also supports shipboard observations on CalCOFI and NMFS

Rockfish Recruitment and Ecosystem Assessment Surveys (RREAS) to

quantify seabird and marine mammal abundances. RREAS surveys resumed in

January and April 2021. SCCOOS PI Bill Sydeman at Farallon Institute is

working to implement new statistically derived data products to be shared with

the IOOS community. One of these newly derived products will include a

dataset of time series of density for 20 species by season for the period May

1987-present. Also, working with NOAA Environmental Research Division we

posted the seabird dataset on the ERDDAP (click here) for the benefit of the

marine science community. Bill Sydeman is also working with collaborators from

NMFS, Chapman University, and others on a manuscript investigating the

effects of climate change and fisheries on range shifts of seabirds from the

subtropics into the California Current. This investigation focuses on several

species whose distributions have shifted from the Mexican Pacific and the Gulf

three field cruises (Jan 2021, May 2021, and July 2021).

of California into the Southern California Bight.

bloom areas and a seasonal water quality time series analysis via Google Earth Engine will further inform partners' decision-making practices related to L. polyedra management efforts. SCCOOS and CDIP Partnering with Birch Aquarium **Summer Camp Tours**

Left: Birch Aquarium summer camp tour of CDIP and SCCOOS on August 10, 2021. Right: Randy Bucciarelli, CDIP Programmer, explaining how the wave buoys measure wave height and direction and how the US Arms Corps of Engineers, mariners, lifeguards, oceanographers and beach-goers use the data. Photo credit: Birch

Birch Aquarium is partnering with Level Up San Diego to provide a fun and engaging week of camp for youngsters affected by the loss of learning and socializing this past year. The camp is a five-day exploration-based experience for San Diego Unified School District's middle school students focusing on Scripps Oceanography research, how humans are impacting the oceans, and developing solutions to protect our ocean planet. The Coastal Data Information Program (CDIP) and SCCOOS have been providing weekly summer tours of wave-buoy and HF radars and explaining how some of our ocean observing technology is used for marine operations, monitoring climate variations and change, coastal hazards, and ecosystems, fisheries, and water quality, in particular harmful algal

Aquarium at UCSD/SIO.

blooms.

IOOS RICE Audit Complete

EGRATED

clicking the links below.

Observations for the U.S. West Coast

April 20 - West Watch Webinar

July 20 - West Watch Webinar

Funding Opportunities

Climate Program Office NOFO

deadline is 12-August, 2021.

Recent Publication

2020 to 31 May 2021.

cetaceans. Harmful Algae.

at Imperial Beach, CA. Natural Hazards.

& Environment.

May 18-21: OceanVisions Summit

... WF BUOY

- Soares, N. (2021). Phytoplankton Community Response to Changing Environmental Conditions Across Two Central California Sites. California Polytechnic State University - San Luis Obispo. • Takeshita, Y., Jones, B.D., Johnson, K. S., Chavez, F.P., Rudnick, D.L., Blum, M., ... & Warren, J.K. (2021). Accurate pH and O2 measurements from spray underwater

 - Sep 1 | 12 PM PT: HAB Observing Group Webinar Series The first webinar will provide an overview of the Implementation Strategy for a National Harmful Algal Bloom Observing Network, presented by Dr. Greg Doucette, NOAA NCCOS. Mark this meeting on your calendar. Sep 20-23: Oceans Conference 2021, San Diego, CA • Sep 26-29: Eastern Pacific Ocean Conference (EPOC), Fallen Leaf Lake, Tahoe, Oct 13-14: MBON Plankton Workshops: Plankton ecosystem functions, biodiversity, and forecasting
- Shelf Research. Harris. 2021. NOAA Ocean Acidification Program: Harmful Algal Blooms and Ocean Acidification Workshop: Defining a Research Agenda. U.S. Department of Commerce, NOAA Technical Memorandum OAR-OAP-3, 76 p. Wang, Y.H., Walter, R.K., White, C., Kehrli, M. D., & Ruttenberg, B. (2021). Scenarios for offshore wind power production for Central California Call Areas. Wind Energy. • Wu, X., Feddersen, F., & Giddings, S.N. (2021). Diagnosing surfzone impacts on surface gravity waves. Journal of Physical Oceanography. **Upcoming Activities** Aug 18: Regional Ocean Data Sharing Initiative Technical Work Group Meeting
 - Nov 3-4: Esri Ocean, Weather, and Climate GIS Forum, Redlands, CA Nov 1-4 & 8-11: Coastal and Estuarine Research Federation (CERF) Conference | • Nov 15-19: BlueTech Week | Virtual Nov 16-17: SCCOOS and CeNCOOS Joint Strategic Advisory Council and Principal
 - Southern California Coastal Ocean Observing System info@sccoos.org | https://sccoos.org/ Scripps Institution of Oceanography 8880 Biological Grade, 155 MESOM La Jolla, CA 92093-0206

Investigators Meeting, Avila Beach, CA

- The Senate bill included language for \$100m for Operations, Research and Facilities to improve and enhance coastal, ocean, and Great Lakes observing systems and \$50m for Procurement, Acquisitions, and Contracts for coastal, ocean, and Great Lakes observing systems. Recent Workshops, Conferences, and Webinars
 - Full proposals are due 18-October, 2021 CASG/OPC Prop 68 RFP: CA OOS Shore Stations - Enhanced OAH Observation Letters of Intent are due 30-August, 2021 Full proposals are due 7-October, 2021 NOAA FY22 Federal Funding Opportunity: Understanding Multi-stressor Impacts on <u>Marine Ecosystems Under Climate Change</u>. Letters of Intent are due 4-October, 2021 Full proposals are due 18-Jan, 2022 NOAA NOS Office of Coast Survey RDML Rick Brennan Matching Fund Opportunity for Ocean and Coastal Mapping and Request for Partnership Proposal An informational webinar will be on 9-September, 202 Full proposals are due 29-October, 2021. **Job Opportunities** · The Flanders Marine Institute (VLIZ) is recruiting a Data Manager GOOS Biology, for secondment to the OBIS secretariat at the IOC Project Office for IODE, in Belgium. This is a short-term (initially one year) full-time contract. Duty Station is Oostende (Belgium). Application deadline 10-August 2021.

• The Smithsonian Environmental Research Center (SERC) is looking for a Landscape Ecologist focused on landscape and/or seascape ecology. Application

The <u>IOOS Association</u> is looking to hire a Diversity, Equity, Inclusion, and

System FY16-21 National Oceanographic Partnership Program Report: 1 December

Danil, K., Berman, M., Frame, E., Preti, A., Fire, S. E., Leighfield, T., ... & Lefebvre, K.

Anderson, C. & Terrill, E. (2021). <u>Southern California Coastal Ocean Observing</u>

• Estes, M., Anderson, C., Appletans, W., Bax N., Bednarsek, N., Canonico, G.,

Weiss, E.L., Mitchell, B.G. (2021). Satellite detection of dinoflagellate blooms off

Ren, A. S., & Rudnick, D. L. (2021). <u>Temperature and salinity extremes from 2014-</u>

C.S., ... & Terrill, E. (2021). An early warning system for wave-driven coastal flooding

2019 in the California Current System and its source waters. Communications Earth

California by UV reflectance ratios. Elementa: Science of the Anthropocene. Merrifield, M.A., Johnson, M., Guza, R.T., Fiedler, J. W., Young, A.P., Henderson,

Accessibility Fellow. Application deadline is 10-September, 2021.

- gliders. Journal of Atmospheric and Oceanic Technology. Trautman, N., & Walter, R. K. (2021). Seasonal variability of upwelling and downwelling surface current patterns in a small coastal embayment. Continental Turner, E., E. Ombres, J. Bennett-Mintz, Q, Dortch, M. Broadwater, H. Berger, M.

 - Feb 27-Mar 4: Ocean Sciences Meeting 2022, Honolulu, HI
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