Advancing the Caribbean Coastal Ocean Observing System (NA11NOS0120035)

BUDGET JUSTIFICATION (RESCOPED Yr. 5)

1) Personnel:
   a) Senior personnel: Five senior personnel will receive support (percent of total effort devoted to the program included in parenthesis) for their participation in this project. The Executive Director Julio Morell (77.8%) will be responsible for overall direction and coordination of the project. He is also responsible for the water quality/ocean acidification activities. Technical Director M. Canals (47.6% of 9 month appointment) will be responsible for Co-PI coordination and leadership in technical affairs. Dr. Canals will also assist the Director with general project implementation and personnel supervision and leads the wave (SWAN) and nearshore (FVCOM) modelling programs. Researchers in the various thrust areas are: L. Aponte (2 months) in wind MESONET and WINDNET management and enhancement and WRF implementation and validation and S. Rodriguez (21.5% of 9 month appointment) in nearshore hydrodynamics, water quality and coordinating CariCOOS communications.
   b) Technical personnel: Funds have been allocated for salaries for support personnel essential for the operation, maintenance and development of the observing system components. A high performance computing specialist, compensated at the research assistant level ("investigador asistente" as defined by the UPRM retribution scale) will provide technical advice to directors, be responsible for the ongoing cost effective design, evolution, enhancement and security of CariCOOS high performance computational and communication capabilities including servers and networks required for data transmission. He will also be responsible for computational experimentation required for model performance optimization and computational efficiency. A 10 month postdoctoral appointment will be responsible of operational modelling efforts. An Executive Officer ($3000/month) will support, collaborate and advise the CariCOOS Executive and Technical Director in all administrative functions pertinent to financial and human resources. An administrative assistant ($1833/mo.) will be supported as a part time (50%) and provide assistance to the Technical Director and the Executive Officer. A specialist in underwater activities ($2015/mo.) will be responsible for maintaining, programming, deploying and retrieving of instrumentation including technical diving when required and supporting diverse marine activities as instructed. A web page designer ($1850/mo.) will construct, maintain and upgrade CariCOOS web pages and data interfaces, will develop and maintain numerical and graphical data products and will support outreach and education effort by assisting CariCOOS scientists in engaging stakeholders via social media, he will also coordinate product development services by contractors and interns. A research technician $1000/mo. will lead chemical analysis as required.

2) Travel:
   A total of $30k has been budgeted for travel related to field operations, outreach and coordination activities, CariCOOS Inc. meetings, participation in IOOS meetings and national scientific symposia. Funds requested include support for international travel (8k) to neighbor island nations implementing ocean observing initiatives of interest to CariCOOS and for participation in the Fourth
Annual Assembly of the Mediterranean Oceanography Network for the GOOS. (Palma de Mallorca. 4, 5, 6 November 2015).

3) **Equipment:**
   a) **Major Equipment (over $5000):** Yr. 5 funds ($20.6k) will be utilized to acquire a 1200kHz Nortek ADCP to be used for shallow water applications required for observational activities related to validation of nearshore models. Additional acquisitions, utilizing $40k saved from the purchase of the two HF CODAR antennas plus carried over funds from delayed equipment purchases budgeted in yr. 4 include: $44.2k for an outboard powered boat/trailer for rapid response and field operations, $20.6k for a 600kHz Nortek ADCP for replacing an obsolete unit currently installed aboard a data buoy and $15k for a Total Alkalinity titrator to replace a malfunctioning obsolete unit utilized for the Ocean Acidification Monitoring Program. A 6 KW UPS ($6k) will provide backup power for the Isla Magueyes computational node and a server with a cost of $6k will be acquired for backup purposes.

   b) **Minor equipment:** Minor equipment to be purchased includes two workstations ($5.7k) for model implementation, mesh construction and computationally intense visualizations. Minor equipment to be acquired with carryover funds from year four include an SBE Microcat ($4.5k) as spare replacement for the next buoy maintenance cycle and $5.5k for two laptop computers to replace obsolete units.

4) **Supplies:** Funds ($20k) have been allocated for equipment maintenance and calibration of buoy sensors. Also, $20k is required for general supplies including buoy jewelry, wave buoy batteries and laboratory materials. Funds are requested for software ($4k), communication and media ($10k). Ship-time is requested ($11k) for occupations of drifter and SeaGlider deployments and or other operations. $10k will be utilized for raw materials and GPS units for construction of CariCOOS low cost drifters.

5) **Contractual:**
   a) **Renewals:** Funds are assigned for the following subawards/contracts: $233.5k to, U. Maine (N. Pettigrew) for the maintenance, monitoring and data management of 4 CariCOOS data buoys and the data management of the UVI-EPSCoR buoy data; $27k to WeatherFlow Inc. for the continued operation, maintenance and access to the NRT data from 13 coastal Mesonet stations and funds totaling $55k U. Texas Dallas (S. Leonardi), corresponding to $45k from this year’s allocation plus $10k to be carried over from yr. 4, for finalizing the implementation, validation, operational deployment of regional scale ROMS/AMSEAS and transfer of UPRM CariCOOS. A subaward totaling $206.2k will also be issued to the U. of the Virgin Islands, $112k corresponds to yr. 5, $2.5k for hosting the IOOS Advisory board meeting and $91.6k to be carried over from the previous year. UVI will support the operation and maintenance of the UVI-EPSCoR buoy and its redeployment to the USVI north shelf, observational efforts in USVI reef ecosystems (thermistors array and CTD), the implementation of the USVI Outreach and Education plan and the installation and operation of a side looking ADCP in West Gregerie Channel, Charlotte.
Amalie, St. Thomas. A subaward to Rutgers University ($55.2k, Dr. H. Hoarty) for their continued collaboration in the deployment and operation of CariCOOS HF Radar systems includes funds for the lease of a 5 MHz CODAR SeaSonde system to be experimentally installed on the west coast of St. Croix. A $34k subaward ($26k corresponding to yr. 5 and $8k to be carried over from yr. 4) will also be extended to Dr. J. Salisbury, U. of New Hampshire. This initiative, funded by NOAA’s Coral Reef Monitoring Program, will support their collaboration in the CariCOOS Ocean Acidification Program.

b) **Original**: A subaward to CariCOOS Inc. (C Inc., formerly CaRA) totaling $352k will support its development, certification and function as a Regional Information Coordination Entity as defined by the ICOOS Act (2009). Proposed activities include general organizational affairs including hosting Council and General Assembly meetings, supporting Chairman and Council travels and meetings as required, supporting DMAC directorship and outreach and education services in Puerto Rico and the USVI. C Inc. will also be responsible for supporting CariCOOS activities potentially demanding immediate response such as asset recovery, maintenance and deployments, as well as expenses related to offsite deployment of CariCOOS personnel as required.

c) **Service contracts**: These will be awarded procuring the following services: field operation services ($10k), legal and accounting services ($15k) in support of CariCOOS and CaRA affairs and certification process, DMAC & modeling consultants ($20k). Candela Creative will be retained to maintain and upgrade the new CariCOOS web page ($19.4k). Caribbean Wind LLC will finalize implementation and deploy the CariCOOS Data Explorer, a map based interface for display of real time and model data ($19k). Surfrider Foundation Inc. will manage a volunteer based coliform monitoring effort for western PR beaches ($10k).

6) **Other costs**: (Students and interns) With the requested funding ($115.3k) CariCOOS will support 9 graduate and undergraduate students who will, under the supervision of CariCOOS investigators, collaborate as research assistants in the modeling, observing and DMAC subsystems.