Table 1. Institutional members of *Current Science*

Category	Subtotal	Percentage
Universities and institutions	135	33.25
CSIR, DRDO, DAE, ICAR, ICMR	152	37.19
Union Ministry, State agency, DST, DBT	77	18.97
Public–Private R&D centres and institutions	42	10.34

It is found that at least 22 institutions are wrongly designated/categorized. For instance, Central Coffee Research Institute, Chikmagalur is not a CSIR laboratory. Institutions such as Bharath Institute of Higher Education, Chennai; Chennai Mathematical Institute, Chennai; SASTRA University, Thanjavur and Sri Ramachandra University, Chennai are not State Universities – they belong to 'Institutions deemed to be universities' (under section 3 UGC Act, 1953) and are not funded by UGC. Two private universities are listed as State Government universities. Moreover, the nomenclature of a few privately funded institutes is listed without following the norms of UGC regulations (2010). No deemed university can suffix the word 'university' (http://www.ugc.ac.in/oldpdf/regulations/gazzeetenglish.pdf). One would not call Indian Institute of Science a university! It is unfortunate that many deemed universities deceptively use the word 'university' in the names of their institutes. For correct nomenclature of universities one may refer to http://www.ugc.ac.in/oldpdf/alluniversity.pdf.

I am of the opinion that more number of institutional members could bring a better fiscal convenience for the publisher with a concern for open access to millions of readers. Among the 640 universities in India, less than 25% are institutional members of *Current Science* and the private universities and private deemed universities contribute a meagre 14 (3%). Two hundred and seventy-four autonomous colleges of 70 state universities are potential candidates and not yet listed, though some of them have subscribed for the print version. If we presume that most of the print versions of Indian journals are printed in a few thousands, what is the optimum number of institutional members for the sustainability of *Current Science*? It is an open-ended question to all categories of institutional members!

The classification of the members is found in the web pages only (not in the print version to my knowledge). I have pointed out in good faith the errors committed in designating the institutional members. The students, faculty, researchers, working professionals or simply stated science information seekers can extend their wholehearted support for open access science journals. We must encourage a culture of critical reading and sustainable growth of peer-reviewed open access science journals.

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Severe oxygen depletion in the shallow regions of the Bay of Bengal off Tamil Nadu coast

Oxygen depletion in the subsurface waters and formation of hypoxic/anoxic systems has expanded significantly in coastal systems around the world in the last few decades[1]. Depletion in dissolved oxygen concentration in the water column leads to hypoxic ($O_2 \leq 2$ mg l^{-1}) and/or anoxic ($O_2 \leq 0$ mg l^{-1}) conditions, and further formation of oxygen minimum zones (OMZs) in the coastal areas. Oxygen deficiency in the shelf region could be a critical determinant for fisheries, ecological and biogeochemical processes[2] along with the economic condition of the region. Rise or expansion of hypoxia and anoxia at par with the urbanization and industrialization indicates major perturbation to the structure and functioning of coastal marine ecosystems. Here we report the vertical expansion of hypoxia within OMZ along the outer shelf and slope region, and emergence of an inner-shelf hypoxia that was not apparent in the southwestern Bay of Bengal (BoB).

Off BoB hypoxic conditions are persistent on the outer shelf beyond 100 m and OMZ ($O_2 < 0.7$ mg l^{-1}) is present from 150 m to about 600 m (refs 3, 4). Minimum oxygen concentrations within the Indian Ocean OMZ are generally deeper (~ 800 m) than the Atlantic and Pacific Oceans[5]. Long-term data (1960-1990) on the Indian Ocean, Arabian Sea (AS) and BoB show constancy in OMZ over the past few decades[5,6] (Table 1). However, shelf water column hypoxia and anoxia was not prevalent in BoB.

The Bay of Bengal sustains a strong potential for impacts from riverine nutrient loads due to the very high nutrient yield in its catchment basins, e.g. via the Ganges/Brahmaputra, Godavari and Mahanadi rivers[7]. It is the most open of all the systems receiving high nutrient inputs, with no physical barriers separating its coastal zone from the open ocean. During the southwest (SW) monsoon (July–September), isopycnals from depths up to about 70 m surfaced due to upwelling forced by local winds, and the geostrophic velocity in the upwelling band is in the direction of the winds. The residence time of the intermediate waters or OMZ (100–1000 m) of the bay is 12 years[6]. Southern and northern regions of the bay have distinct mixed layer depths

Table 1. Summary of previously reported hypoxia and anoxia and their proximity within the southern Bay of Bengal spreading to central and western parts. The oxygen minimum zones encountered in the previous observations are presented for a comparison with the present oxygen scenario within the southwestern BoB

Area in BoB	Hypoxic depth (m)	Anoxic depth (m)	Year	Observed OMZ* (m)	Reference
8–20°N, 80–100°E (15°N, 90°E)	90–200	200–490	1893–2004	180–490	10
West and Central	91–104	104–389	1906–1990	91–582	3
6–12°N, 80–98°E	100	–	1994–2001	100–1000	6
Central (20°N)	–	150–700	2001	150–500	11
Western (12–20°N; 81–85°E)	150–300				
Central (11–15°N)	100–120	120–500	2001–2003	120–600	12
11–13°N, 79–80°E	Beyond 24 m (inner shelf region)	–	September 2010 July 2010	55–215 and beyond	Present study
	59 m (outer shelf and slope region)	98 (slope)			

*Limit of OMZ: $O_2 \leq 0.7$ mg l^{-1} (0.5 ml l^{-1} or 22 μmol l^{-1})[3]; Hypoxic depth ($0.14 < O_2 \leq 2$ mg l^{-1}); Anoxic depth ($O_2 = 0$ mg l^{-1}).

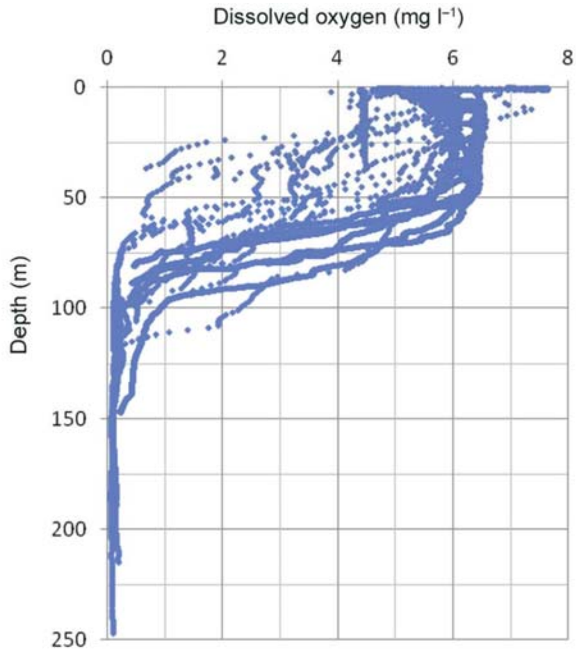

Figure 1. Vertical distribution of oxygen profile in southwestern Bay of Bengal, (11–13°N; 79–80°E) up to 250 m depth during 2010.

(MLDs) in its western boundary that shoaled from 25 m at 12°N to ~2 m at 19°N. The doming of isotherm has been recorded around 17°N, where a cold-core eddy was evident[8]. Tamil Nadu coast has a wide continental shelf area that spreads 22,411 sq. km with a depth of 50 m and 11,205 sq. km with a depth of 51–200 m.

During a recent expedition (September 2010), when the SW monsoon wind was apparently stronger, we measured a vertical expansion of hypoxia ($0.14 < O_2 \leq 2$ mg l^{-1}) at a minimum depth of 59 m and further anoxia ($O_2 = 0$ mg l^{-1}) at a depth of ~98 m (Figure 1) within 30 km off Tamil Nadu coast. The onset of shallow water (59 m) hypoxia within the OMZ was associated with a sporadic event of inner shelf hypoxia (24 m) in a broad section of the southern Indian east coast. However, earlier reports only explained the hypoxia and further OMZs at the lowest depth of 91 m in the continental slope and ridge[3,6]. In the present study, hypoxia prevailed in several places across the area extending between 11–13°N and 79–80°E, spreading from shelf break to the inner shelf encompassing ~8,000 sq. km. We presumed the phenomenon of hypoxia was not persistent and was spreading vertically within OMZ of BoB due to the local wind-driven upwelling and physical forcing. For further confirmation regarding the upwelling-driven hypoxia, which used to be a seasonal occurrence, data from the year-round observations of the research cruises conducted by the National Institute of Ocean Technology, Ministry of Earth Sciences, Government of India were analysed. It was detected that a shoreward pushing of the upwelled low-oxygen bottom water caused a severe hypoxic condition in the inner shelf region. Interestingly, the observations indicated a year-round hypoxic event in the inner shelf region, which was evident even in the absence of a strong local wind that causes upwelling. The year-round observations during 2010 revealed that the phenomenon was exceptional in its vertical and temporal extent persisting over the shelf area during February, July and September. Even though intense hypoxia is a permanent feature of OMZ that intersects the continental slope (> 800 m in this system), possibly there are no prior records of hypoxia over the continental shelf (February, July and September 2010) and severe anoxia in the OMZ for this marine ecosystem.

It appears that development of the present coastal hypoxia is a result of enhanced terrestrial nutrient loading as reflected in the sharp increase in its concentration, which in turn could have promoted microbial activity resulting in elevated respiration[9]. This resulted in greater demand for oxygen leading to a depletion of dissolved oxygen, which further gets adversely affected as the water column stratifies. The rate of exchange between coastal and open water masses and addition of highly nutrient-enriched river discharge from catchment areas result in persistent hypoxia. However, in open water circulation systems (BoB), with increasing eutrophication, hypoxia might become a common phenomenon in coastal areas. BoB is highly susceptible since it receives large river run-off and is located close to regions of high population density as well as intense agriculture. Irrespective of a seasonal prototype, emergence of hypoxia and anoxia in Arabian Sea and BoB witnessed year-round hypoxic and anoxic zones in 2010 that were not registered in the earlier expeditions.

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IndiaBioscience

No one can stop an idea whose time has come. Formation of IndiaBioscience (IBS) truly echoes this. The idea for IBS emerged in 2009 when the scientific community in India with help from others abroad (Ron Vale at UCSF deserves special mention) started the YIM (Young Investigator Meet). The first YIM was held in Kerala in 2009. It brought together 40 Indian junior faculty, 20 postdoctoral fellows and senior scientists from India as well as leaders from the Indian Government, and a stellar group of international scientists, who agreed upon the need for an informational and interactive forum. This led to the creation of IBS as a platform that caters to the rapidly increasing needs of the life science community in India and abroad. IBS is a non-profit science outreach initiative that was created to fulfil the niche gap within the life science sector in India. It is dedicated to serve as a catalyst organization that will facilitate the various activities associated with establishing a strong hold for scientific research on the global arena. This includes recruitment, networking, collaborations, research-oriented education and science communication[1]. BioTech Dhaba is yet another initiative by a group of Indian students teaming up for collective resourcefulness. It mainly focuses on the needs of undergraduates[2]. Both IBS and BioTech Dhaba have an active Facebook groups aimed towards connecting scientists and students on social media for informal scientific discussions and queries[3,4].

IBS aims to promote and disseminate information regarding the research environment and opportunities in India throughout the year and enables the scientific community to keep track of the research activities in the country. IBS also aims to do activities like YIM that would prove crucial in building the future scientific community in India. No matter how talented, smart or capable you are, you cannot do it alone in science. Collaborations in science are as important as the experiments itself. Networking among scientists is vital in building collaborations. Networking in addition would also foster achieve interdisciplinary goals that are needed in science. With its impressive YIM continued over the past few years, IBS not only tries to reach out to bring back the required talent, but fosters networking for future collaborations among scientists. It also functions as a nodal organization for exchange of scientific expertise.

India truly needs a comprehensive plan for science outreach in this century. IBS is a step forward in this direction.

1. http://www.indiabioscience.org/
2. https://sites.google.com/site/biotechdhaba/
3. https://www.facebook.com/groups/indiabioscience/
4. https://www.facebook.com/groups/biotech-dhaba/

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