Summary Report

About Department/Center/School: The Centre is established in March 2005 with a vision to impart quality education in Earth System Science & Technology and conduct advance research on the multi-disciplinary aspects of earth and climate sciences with major focus on Land-Ocean-Atmospheric sciences interactions. Since 2006, the centre is offering M.Tech. degree in *Earth System Science and Technology*. The Centre has been actively participating in various programs of research and application importance at national and international levels.

1. **Academic Programs (Range of Degrees and Disciplines):**

   M.Tech. degree in Earth System Science and Technology
   Ph.D. and MS degrees

2. **Major 4-5 Thrust Areas of Research:**

   Ocean Modeling and Satellite Oceanography
   Observations and Modeling of PBL dynamics
   Remote sensing of Biodiversity and Ecological Climatology
   Modeling of extreme weather events and regional climate
   Cryospheric Studies and Satellite Oceanography

3. **Curriculum and Courses & Teaching Environment**

Items	**Ratio/ Number**	**Items**	**Number/ %**
Teacher-student Ratio	1:9	Average No. of students motivated (%) to opt of careers Eng/ Tech. Sectors UG/PG/PhD	NA/08/00
No. of Faculty members as on today	06	Average No. of students motivated (%) to opt of careers in Science sectors UG/PG/PhD	NA/35/02
Average No. of Tutorial Assistants	00	No. of teaching labs	01
No. of UG/DD students	00	Average No. of students per experiments in core courses	02
No. of PG students/PhD students	24/31	No. of Students' workshops/``Tinkering'' Labs	00
Average no. of tutors with more than 100 students	05	No. of new courses introduced	02
Average Students placements (%) (UG/DD/PG)	NA/NA/100%	No. of New program introduced	01
No of major curriculum review in both UG & PG level	NIL	Undergraduate Vs PhD strength expressed as Percentage	NA
No of UG lab (teaching labs) developed/set-ups	NA	No of PG/research labs developed/new set up	01
No of E class rooms	NIL	No. of lab classes per week	1.5
Average No. of Course done per student for B. Tech/DD/M. Tech/Ph.D	NA/NA/12/08	No. of core/elective/seminar/projects subjects taken for B. Tech, DD, and M. Tech respectively	04/06/02/01

4. Research and Development & its Environment

Items	Number	Items	Number	Items	No.
Total No. of Publications in Journals (2008-13)	76	Average no. of citation per paper	1.5	No of large interdisciplinary research projects	15
Total No. of Publications in Conference & Symposium	78	Average Journal publication per year	12	Number of Int. conf./workshops attended by students	24
Total No of Books & e-books published	NIL	h-Index of the department since 2008/overall h-index in Scopus	6/7	No. of PDF hired in the Institute	NA
Total No of Edited Conference Proceedings /book chapters	09	Number of papers with citation more that the average no. of citation of the Journals	NA	No. of international Students as PhDs/PDFs	NIL
Total No. of Technology Developed/transferred	NIL	No. of recognitions & Awards, fellows etc to faculty/students (provide break up if necessary)	7/9	No. of International visiting researchers/ adjunct faculty stayed here for at least a week	01
Total No. of Patents Filed/Obtained	NIL	Average Retention(%) of Young faculty for at least 10 years	100	No. of short courses/workshops /conf. organized with international participations	02
Total No. of Copyright Filed/Obtained	NIL	No. of Sponsored research Project /fund(lakh) generated from non-internal source	29/1000	Average No. of PhD granted per year	2 (Since 2012)
No. of Publications per Faculty/Masters/PhD students	27/<1/4	No. of Consultancy /fund (lakh) generated from non-internal source	2/4	Average No. of PhD Granted per year per faculty	<1
No. of Publications per Faculty/Masters/PhD students in Top Ten Journals as Identified by the department	5/<1/1	No of Internal and external Collaborations research papers/research projects/PhD students	12+43/0+12/4+2	Patent granted per faculty	NIL
Average No. of Citation per faculty per year	3	No of M. Tech students motivated into pursuing PhD/PhD graduates motivated to pursue career in Academics(abroad or IIT etc)	35/3	Number of articles in collaborations with Ten countries*	01

Ranking of the department in terms of average citations per paper within the Institute		Ranking of the department in terms of total number of Journal publications within the Institute/publications per faculty		No of articles of the dept. contributing towards h-index of the Institute since 2008	

5.External Stakeholder Engagement and others

Items	**Number**	**Amount Lakh**
No. of PhD/Master students' thesis funded by Industries	01/01	NA
Total number of Industry sponsored projects and its income (Lakh)	01	17.6
No. of Curriculum Development Initiative for Industries	NIL	NIL
No of Technology transfer/adopted by Industry/Labs	NIL	NIL
No. of Nationally relevant research projects	29	1000
No of Policy inputs/consultancies provided	01	40
No. of Research grant and seed money from internal savings of the Institute per young faculty of the department and its total fund	NIL	NIL
No. of Community Relevant projects	29	1000

6. Vision for the Future (in brief):

(a) Departments/centers/schools should spell out its Mission and Vision Statements, (b) Plans for future to achieve the projected goals and (c) measures adopted towards above.

The Centre has set its goals, made strategies to meet the goals in phases in corroboration with the Institute's broad vision. The Centre is leading *Digital Earth Initiative* of the Institute and gearing up for the development of a meso-scale Land-Ocean-Atmosphere coupled model, especially to suitable for Indian sub-continent for better understanding. The Centre aims at being a hub in the Global network of organizations involved in multi-disciplinary earth system studies and research; also contributing to the national development by informing the policymakers of the technological and scientific advancements in the field. The Centre has prepared a visionary road map and planned to execute in stages towards achieving the broad objectives; i.e., *excellence in advanced teaching and research in earth system and climate studies*.

7. External peer review of the Dept./centre/schools (in brief):

(a) Date of the peer review: January 7, 2014

(b) Name of the Experts involved and their affiliations in short:

1. Prof. P. C. Pandey, Emeritus Professor, IIT Bhubaneswar;
2. Dr. M. Ravichandran, Head, Modeling and Ocean observation Group, ESSO-INCOIS, Hyderabad;
3. Dr. S. Prasanna Kumar, Deputy Director, NIO-CSIR, Goa.

(c) Overall recommendations of the peer review committee: Strengths, weaknesses, suggestions and comments

- The faculty members performed well in their respective disciplines in past years. The numbers of the publications are impressive; however, the committee has advised to progressively climb up in the impact factor ladder of journals.
- Since the faculty members of CORAL have expertise in oceanography, meteorology, ecology and land surface interactions processes with modeling and data integration capability, it is ideal to integrate and develop a ocean-atmosphere-land coupled mesoscale model for different studies such as ocean state forecast, short & long term weather prediction, land system processes, cryosphere *etc*.
- The committee recommended enhancing the collaborative efforts with institute of national and international repute. Efforts should be made to hire more international and national faculty members to enhance diversified thinking and innovativeness.

(d) Measures adopted/action taken at the department level to address the recommendations of the peer review report:

1. Initiative is being taken to recruit faculty so that the Centre can broaden the horizon of its research.
2. The faculty members have entered into collaboration with faculty and Scientists of international and national repute through the Institutes initiative of ISWT. The faculty members are submitting joint research proposals and sharing M. Tech. and Ph.D. students with faculty of national and international repute for Dissertation/ thesis work.

8. **Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis of the Department**

STRENGTHS	**OPPORTUNITIES**
1. Young and enthusiastic faculty 2. Interdisciplinary quality teaching 2. Integrated application oriented research 3. Interdisciplinary students 4. Conducive academic environment 5. Feedback and monitoring system 6. Active involvement in national and international programs **WEAKNESSES** 1. Inadequate infrastructure for teaching and research 2. Lack of Laboratory facility 3. No trained supporting staff 4. Insufficient ground observation system	1. Potential to act as a *Centre of Excellence* in integrated earth and Climate Change studies and research under MOES/ DST/DOS, Government of India. 2. To study and generate lot of data products in this part of Indian subcontinent, which has been a gap at World level 3. To cater to the global requirement of trained manpower in this area of studies and research 4. Potential to act as nodal centre for many national and international programs in this area **THREATS** 1. Growing number of institutes offering similar courses may lead to job competition

***Note: Ten countries: US, UK, Germany, Japan, Canada, France, Italy, Australia, Singapore, South Korea (Optional :China may be replaced with anyone if department wants)**

Important Highlights

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1. **Academic Programs (Range of Degrees and Disciplines):**
   M.Tech Degree in Earth System Science and Technology
   Ph.D & MS in Land-Ocean-Atmosphere System

2. **Major 4-5 Thrust Areas of Research:**
   Modeling of extreme weather events and regional climate
   Observations and Modeling of PBL dynamics
   Ocean Modeling and Satellite Oceanography
   Remote sensing of Biodiversity and Ecological Climatology
   Cryospheric Studies

3.	**No. of Faculty members as on today**	**06**
4.	**No. of PG students/PhD students**	**24/31**
5.	**Average Students placements (%) (PG)**	**100%**
6.	**Total No. of Publications in Journals (2008-13)**	**76**
7.	**Total No. of Publications in Conference & Symposium**	**78**
8.	**Total No of Edited Conference Proceedings/book chapters**	**09**
9.	**Average Journal publication per year**	**12**
10.	**No of large interdisciplinary research projects**	**15**
11.	**No. of Sponsored research Project**	**29**
12.	**Total fund generated from non-internal source (in Lacs)**	**10,00**
13.	**No of collaborative research projects**	**12**
14.	**No of collaborative research papers**	**43**

15. **Overall recommendations of the peer review committee: Strengths, weaknesses, suggestions and comments**

- *The faculty members performed well in their respective disciplines. The number of the publications is impressive; however, the committee felt that the faculty members should aim to publish their work in high impact factor journals*
- *Efforts should be made to hire more foreign /national faculty members, in order to introduce fresh thinking and greater diversity*
- *Since the faculty members of CORAL have expertise in oceanography, meteorology and land-surface processes with ocean and atmospheric modeling capability, it is ideal to*

have a common theme of CORAL to develop ocean-atmosphere coupled mesoscale model for different processes studies such as ocean state forecast, cyclone prediction, short term weather, thunderstorm, etc.

- *The committee also recommended CORAL to enhance the collaborative efforts with national and international institute of repute*

16. Measures adopted/action taken at the department level to address the recommendations of the peer review report:

1. Initiative is taken to recruit faculty so that the Centre can broaden the horizon of its research.

2. The faculty members are encouraged to take up collaborative research with reputed national and international institutes and get their works published in the journals with high impact factor.

17. Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis of the Department

STRENGTHS 1. Good quality faculty 2. Adequate and quality Research outputs 3. Reasonably good students 4. Conducive academic environment 5. Periodic feedback of the students 6. Active involvement of the faculty members in national and international programs **WEAKNESSES** 1. Inadequate infrastructure for teaching and research 2. No trained supporting staff	**OPPORTUNITIES** 1. Greater willingness towards sustainable development with changing climate scenario and environmental changes 2. Growing public interest and awareness about weather and climate 3. Increase in research activities: Ph.D and sponsored research 4. Possibility of having a Centre of Excellence in Climate Change **THREATS** 2. Growing number of institutes other than IITs providing attractive opportunities is a threat to retain good faculty and get good students 3. Competition with the foreign universities having campus in India 4. Lack of good quality faculty in near future