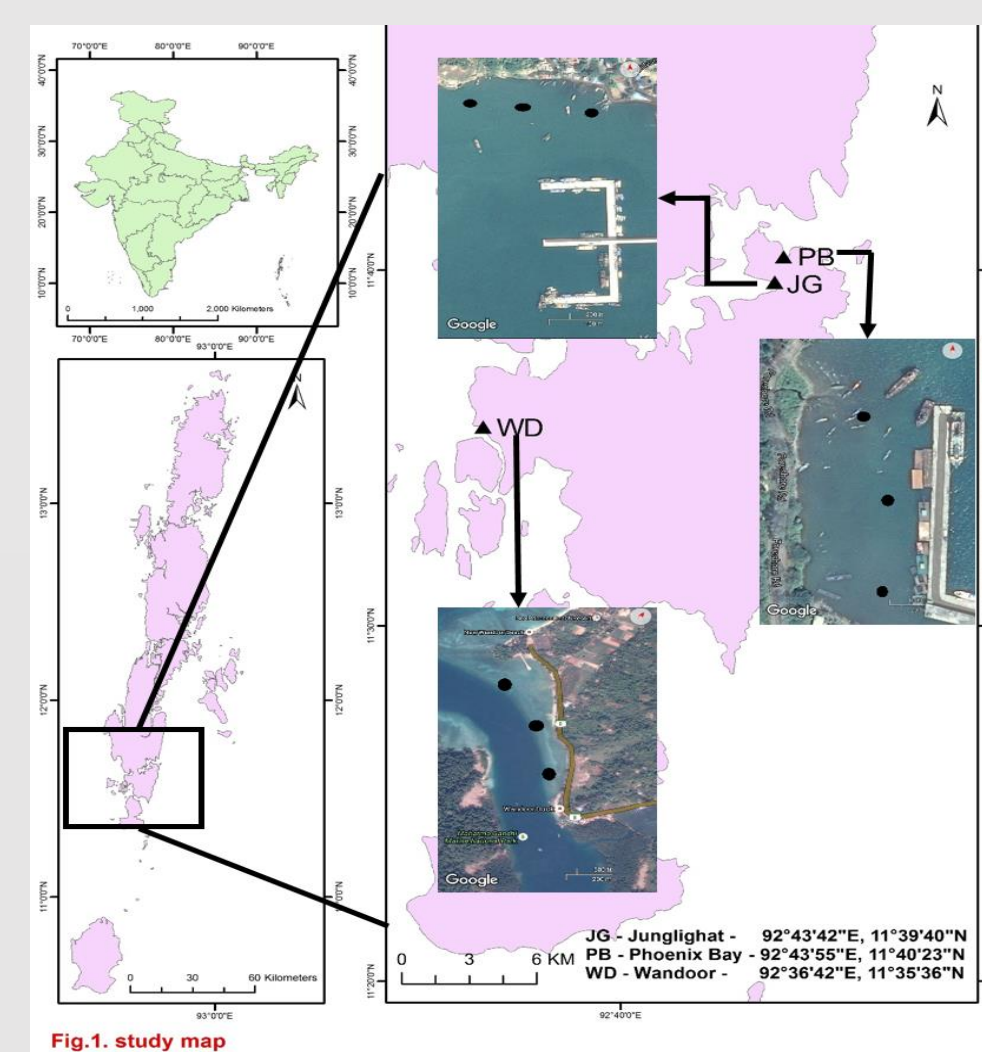


## Introduction

- The Andaman and Nicobar are dynamic, diverse, productive and sensitive Islands ecosystem.
- Human population, tourism and recreational activities have increased the sewage discharge and other pollution in the Islands.
- Adverse effect of sewage mediated disturbance on benthic ecosystem and its functioning are globally recognized (Ganesh et al., 2014, Gusmao et al., 2016).
- As a result, the coastal marine environment of Port Blair are under stress.
- Several Biotic tools for assessing the health of marine ecosystem in temperate latitudes have been formulated (Birk et al., 2012, Vinagre et al., 2016).
- In such scenario, we assessed the ecological health status of Port Blair coast, using benthic biotic indices.

## Methodology

- Based on [Pearson-Rosenberg model](#), three tropical intertidal habitats with different disturbance magnitude were evaluated (Fig 1).
- Total 235 samples (25 × 25 cm) were collected during dry period (Jan, Feb and Mar) from 2014-2016.
- Dissolved oxygen, salinity, temperature, pH and sediment organic matter and texture were analyzed.
- Sediment samples were sieved (0.5mm), fauna were sorted and identified to the lowest possible taxonomic level.



## Statistical Analysis

- Numerical abundance data of macrofauna was used for benthic habitat quality assessment using AMBI v.5.0 software package. Significant relationship was analyzed by CCA plots and PCA ordination using the PAST v.2.17c and PRIMER v.6.1.10 software.

## Results and Discussion

- The EGIV (Spionidae) and EGV (Capitellidae) dominant at PB and JG with peak abundance during 2016 (Fig. 2). Organic enrichment and distribution of EGs did not show any relationship, except for EGIII (*Orbinia sp.*) at PB.
- Intermittent disturbance might be the cause of 2<sup>nd</sup> and 1<sup>st</sup> order opportunistic response (surface and sub-surface deposit feeders) even at mild organic input (Sampaio et al., 2011).
- Amphipoda (EGI), *Axiiothella* and *Ophelia spp.* (EGI) were associated with high sand proportion (96%) and less OM (0.5%) at WD (Aflie et al 2008).
- High DO, salinity, temperature and pH of WD suggests natural condition (Borja and Tunberg 2011). Coarser grain size, high rate of aeration and oxidative degradation of organic substances support rich faunal assemblages (Barboza & Defeo 2015, Defeo & Mclachlan 2005).
- Constant gradual decline of diversity at JG, high mean abundance of opportunistic species at PB and comparatively high biomass at WD clearly define human pressure gradient (Table 1 Fig. 3) and also suggest a transitional state of urban proximity from high to good (JG) and moderate to poor (PB) coastal quality.
- Results demonstrate annual decline of benthic quality status from 2014 to 2016 (good to moderate). Obvious delineation was apparent in 2016 in particular, at PB and JG.
- BOPA, AMBI and M-AMBI showed a shift from good to moderate (JG), good to poor (PB) and high to good quality status (WD), indicates increase in rate of disturbance (Fig. 4 & Fig. 5).
- Overall BOPA failed to distinguish disturbance magnitude. However, AMBI and M-AMBI were agreed to qualify the BQS, both in space and time, from undisturbed (WD), slightly disturbed (JG) to moderately disturbed (PB).
- PCA ordination clearly separated impacted (PB and JG) and non-impacted (WD) sites (Fig. 6). Canonical axes 1 & 2 explained up to 65% of total variance (permutation 999, p < 0.001) by CCA plot (Fig. 7).

## Conclusion

- Study implies the performance of temperate benthic biotic indices in tropical transitional habitats.
- Among all the indices, multi-factorial extension of AMBI (M-AMBI) appeared strong descriptor in terms of qualifying the BQS.
- For an effective assessment, setting natural reference condition, mild organic enrichment and stable dry period (avoid strong seasonality in tropics) are desirable.
- However, in order to test the performance of biotic indices, Long term monitoring approach of taking abiotic and biotic descriptors in to account is recommended.

Table 1.	JG (n=80)		PB (n=77)		WD (n=78)		Overall (n=235)	
	Average	EQS	Average	EQS	Average	EQS	Average	EQS
W-statistics	-0.034	polluted	-0.138	Heavily Polluted	0.004	Unpolluted	-0.088	polluted
H' <sub>log<sub>2</sub></sub>	3.4±0.5	Good	1.9±0.8	Poor	3.1±0.5	Good	2.8±0.9	Moderate
BOPA	0.120±0.05	Good	0.104±0.08	Good	0.058±0.04	Good	0.094±0.06	Good
AMBI	2.89±0.39	Good	3.67±0.66	Moderate	1.67±0.33	Good	2.73±0.92	Good
M-AMBI	0.768±0.05	Good	0.528±0.06	Moderate	0.863±0.06	High	0.723±0.15	Good

