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1 **Satellite-based observations of intense chlorophyll-*a* bloom in response of cold** 2 **core eddy formation: A study in the Arabian Sea, Southwest Coast of India**

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14 **Abstract**

15 Mesoscale phenomena are highly energetic features of ocean dynamics and circulation patterns.
16 Their influence on biological and biogeochemical processes varies widely from advective
17 transport and also from the generation of variation in the environment that affect biological and
18 chemical rates. This study investigates the surface chlorophyll-*a* (Chl-*a*) bloom affect in the case-
19 1 (open ocean) waters of Arabian Sea off the southwest coast of India in response to the cold
20 core eddy in the post-monsoon 2016 using satellite based observations. The 8-day composite of
21 Chlorophyll-*a* (Chl-*a*), Sea Surface Height Anomalies (SSHA), Sea Surface Temperature (SST)
22 and the wind field vectors were analyzed to study the Chl-*a* bloom characteristics and eddy
23 mechanism. The results show that a very high concentration of Chl-*a* (6 mg/m-3) bloom occurred
24 during the cold-core eddy formation which lasted for more than a month. Analysis revealed that
25 the Chl-*a* bloom is attributed to the combined effect of surface and subsurface processes such as
26 cyclonic structure of cold-core eddy, high Ekman pumping velocity, negative values SSHA,
27 decreased values of SST, and nutrient injection from subsurface to the surface. Our study
28 concluded that the presence of pre-existing cyclonic cold-core eddy, decreased SST and high
29 Ekman pumping velocity played a major role in the formation of Chl-*a* bloom in the study area.
30

31 **Keywords:** Chlorophyll-*a* bloom, Cold-core eddy, Ekman pumping, Remote sensing, West coast
32 of India.
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36 **1. Introduction**

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