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Article scientifique sur la variabilité saisonnière et interannuelle des courants équatoriaux de surface dans l'Atlantique central, à partir de l'analyse de mesures faites lors de campagnes océanographiques et par des mouillages courantométriques fixes.

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Circulation in the central equatorial Atlantic: Mean and intraseasonal to seasonal variability

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[1] The zonal equatorial circulation of the upper 700 m in the central tropical Atlantic is studied based on 11 cross-equatorial ship sections taken at 23–29°W during 1999 to 2005 and on data from a pair of moored Acoustic Doppler current profilers deployed on the equator at 23°W during February 2004 to May 2005. The observations on the equator reveal the existence of two mean westward cores of the Equatorial Intermediate Current below the Equatorial Undercurrent. In contrast to the 2002 moored observations at the same position the intraseasonal variability during the mooring period is dominated by zonal instead of meridional velocity fluctuations. Citation: Brandt, P., F. A. Schott, C. Provost, A. Kartavtseff, V. Hormann, B. Bourlès, and J. Fischer (2006), Circulation in the central equatorial Atlantic: Mean and intraseasonal to seasonal variability, *Geophys. Res. Lett.*, *33*, L07609, doi:10.1029/2005GL025498.

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1. Introduction

[2] Different from the Pacific and even Indian Ocean, time series of equatorial currents covering a complete seasonal cycle did not exist from the central tropical Atlantic until quite recently. Apart from a frequently repeated ship section along 35°W with Acoustic Doppler current profiler (ADCP) observations from which mean transports were established for the western tropical circulation branches [*Schott et al.*, 2005], only individual shipboard ADCP sections are available for the tropical Atlantic from the time period prior to 2001 [e.g., *Bourlès et al.*, 2002; *Stramma et al.*, 2005].

[3] While for the near-surface flows seasonal cycles could be determined from drifter currents [e.g., *Lumpkin and Garzoli*, 2005] and altimetry [e.g., *Schouten et al.*, 2005], reliable transports and seasonal cycle analyses of the subsurface flows from the interior tropical Atlantic that could serve as a calibration base for model simulations have not become available. Recently, however, time series from moored ADCPs were obtained within the context of the Pilot Research Moored Array in the Tropical Atlantic (PIRATA) [*Servain et al.*, 1998].

[4] A first deployment on the equator at 23°W, covering the year 2002, was evaluated by *Provost et al.* [2004] and *Giarolla et al.* [2005] for the seasonal cycle of the upper 120 m with the major result that the EUC at 23°W shallows during January to May and deepens in the other part of the year. Remarkable intraseasonal variability was found in these observations. *Grodsky et al.* [2005], combining the ADCP time series with other PIRATA and satellite data, demonstrated that the 20–30 day band variability was dominated by Tropical Instability Waves (TIWs).

[5] Here we present two new sets of information from the central tropical Atlantic. First, we have composed a mean section of zonal currents at 23–29°W (called 26°W section in the following) and derived transports of circulation branches for the latitude range between 5°S and 5°N. Second, the upper-layer ADCP of the existing 23°W PIRATA mooring was augmented by a downward-looking "Longranger" ADCP, yielding now a total depth range covered from 12 m to 700 m.

[6] Here, for the first time, the question about the mean and seasonal existence of a westward Equatorial Intermediate Current (EIC) below the EUC is addressed using more than one year of mooring data. Besides the evaluation of the seasonal cycle on the equator of the upper 700 m the time series also allow a study of the structure and vertical propagation of intraseasonal variability.

2. Mean Flow

2.1. Mean Ship Section of Zonal Currents

[7] A mean section of zonal currents was constructed from ADCP measurements obtained in the time period 1999–2005. In the 11 sections used here, shipboard ADCP covered the depth range between about 30 m and some intermediate depth, depending on instrument type used. During some cruises an LADCP was applied additionally at intermediate depths below the depth range of the shipboard ADCPs. Above 30 m the mean flow field was linearly interpolated toward the mean surface flow obtained from the surface drifter climatology [*Lumpkin and Garzoli*, 2005]. The 11 sections consist of four from *Meteor* (Mar./Apr. 2000, 23°W between 5°S and 4°N; May 2002, 28°W between 5°S and 2.5°N; Oct./Nov. 2002, 26°W between 0°N and 5°N; Aug. 2004, 28°W between 5°S and 2°N), three from *Seward Johnson* (all Jan. 2000, 23°W, 25.5°W both between 5°S and 4°N; 28°W between 5°S and 0°N), and one each from *Thalassa* (Aug. 1999, 23°W), *Sonne* (May 2003, 28.5°W between 5°S and 2.5°S), *Ron Brown* (Aug. 2003, ~27°W), and *Polarstern* (Jan. 2005, 23°W upper 300 m).

[8] The resulting mean zonal current section (Figure 1) that represents an average of sections acquired between 23–29°W was then evaluated for transports in the same isopycnal layers that had previously been used for analyzing the mean 35°W section [*Schott et al.*, 2003]. As there is

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1 AUTEUR
Equipe de 7 chercheurs professionnels des deux sexes, spécialistes de l'océanographie physique (tropicale ou non), issus de 3 organismes de recherche français et allemands cités en bas de page

2 STRUCTURE
Texte structuré, mais sans suivre strictement un plan "IMRED" (Introduction, Méthodes, Résultats, Discussion)

3 LANGUE
Anglais, langue de l'éditeur mais surtout de la communauté scientifique internationale

4 STYLE
Impersonnel

5 CITATIONS
Références nombreuses, citées dans le texte et listées en fin d'article selon un format standard

6 VALIDATION
Manuscrit évalué par des chercheurs sollicités par l'éditeur de la revue en fonction du sujet ("référés"). L'article mentionne les dates de réception, de révision, d'acceptation et de publication du manuscrit

7 SUPPORT
Revue scientifique, éditée par une société savante (American Geophysical Association)

8 DIFFUSION
La version imprimée est diffusée dans les bibliothèques spécialisées, mais la revue est aussi disponible sous forme électronique sur l'internet (doi : adresse web de l'article)

Début du XXIe siècle

Depuis la deuxième guerre mondiale, la recherche s'est de plus en plus professionnalisée, spécialisée et internationalisée. La publication est devenue un critère essentiel pour l'évaluation des chercheurs et des laboratoires ("publish or perish"), ce qui alimente l'inflation de la littérature scientifique, introduit une hiérarchie entre les revues et permet aux éditeurs privés d'en imposer les prix.

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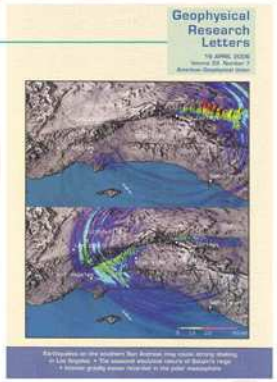

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