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VARIABILITY OF NO, PO AND PO_4* IN THE WESTERN ROSS SEA (ANTARCTICA), 1998-2003

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THE ROSS SEA IS ONE OF THE MAJOR SITES IN FORMING OF ANTARCTIC BOTTOM WATER (AABW), WHICH PLAYS AN IMPORTANT ROLE IN VENTILATING THE DEEP OCEAN. TWO SHELF WATERS CONSTITUTE AN IMPORTANT PART OF THE AABW: THE HIGH SALINITY SHELF WATER (HSSW), CHARACTERIZED BY 34.75-34.85 SALINITY RANGE AND THE ICE SHELF WATER (ISW), DEFINED BY TEMPERATURE BELOW THE SURFACE FREEZING POINT. AT THE CAPE ADARE SHELF BREAK, HSSW MIXES WITH THE ENTRAINING BRANCHES OF CIRCUMPOLAR DEEP WATER (CDW), THE MOST VOLUMINOUS WATER MASS WITHIN THE ANTARCTIC CIRCUMPOLAR CURRENT. THE HSSW DOWN SLOPE MECHANISM IS IMPORTANT FOR OCEAN – CONTINENTAL SHELF EXCHANGE, ENABLING THE EXPORT OF DISSOLVED GASES, SUCH AS OXYGEN, RESPONSIBLE FOR THE VENTILATION OF THE DEEP OCEAN. DATA COLLECTED OFF CAPE ADARE BETWEEN 1998 AND 2003, DURING THE CLIMA PROJECT INVESTIGATIONS AND THREE SUBSEQUENT MESOSCALE EXPERIMENTS, ALLOWED THE DESCRIPTION OF SPATIAL AND TEMPORAL VARIABILITY OF HYDROGRAPHIC PROPERTIES, SUCH AS TEMPERATURE, SALINITY, DISSOLVED OXYGEN AND NUTRIENTS. DISSOLVED OXYGEN AND NUTRIENTS ARE INVOLVED IN THE PRODUCTION AND DEGRADATION OF ORGANIC MATTER, THEREFORE THEY ARE NOT USED AS CONSERVATIVE TRACERS. IF THE RATIO OF OXYGEN UTILIZATION TO NUTRIENT REMINERALIZATION IS KNOWN, A CORRECTION CAN BE MADE FOR THIS EFFECT. THE "CORRECTED" VALUES (NO, PO AND PO_4*) CAN THEN BE USED AS QUASI-CONSERVATIVE TRACERS OF WATER MASSES CIRCULATION. OUR PRI-

MARY AIM WAS TO TRACE THE NEWLY VENTILATED WATER OVERFLOW AT THE SHELF BREAK AND TO EVALUATE ITS CONTRIBUTION TO THE DEEP WATER PRODUCTION THROUGHOUT THE YEARS. THE DISTRIBUTION OF THE WATER MASS TRACERS SUGGESTED THAT IN THE CAPE ADARE AREA THE AMOUNT AND THE CHEMICAL PROPERTIES OF THE OVERFLOWING WATERS WERE DIFFERENT FROM YEAR TO YEAR. OUR EVIDENCES DEMONSTRATED FOR INSTANCE, THAT DURING 2001 SURVEY, THE SIGNATURE OF HSSW WAS WEAKENED BEFORE IT REACHED THE SHELF BREAK, CAUSING PROBABLY A LESS INTENSE VENTILATION OF THE DEEP OCEANS, WHILST IN 2003 A STRONG OVERFLOW WAS EVIDENCED.