

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. Agency Use Only (Leave blank).		2. Report Date. 1990	3. Report Type and Dates Covered. Abstract	
4. Title and Subtitle. Process Studies of the Complex Mesoscale Circulation Observed in the Western Mediterranean Sea			5. Funding Numbers. Program Element No. 62435N Project No. RM35G84 Task No. Accession No. DN256002	
6. Author(s). George Heburn			8. Performing Organization Report Number. AB 91:323:002	
7. Performing Organization Name(s) and Address(es). Naval Oceanographic and Atmospheric Research Laboratory Stennis Space Center, MS 39529-5004			10. Sponsoring/Monitoring Agency Report Number. AB 91:323:002	
9. Sponsoring/Monitoring Agency Name(s) and Address(es). Naval Oceanographic and Atmospheric Research Laboratory Stennis Space Center, MS 39529-5004			11. Supplementary Notes. Commission International Pour L'exploration Scientifique De La Mer Mediterranee	
12a. Distribution/Availability Statement. Approved for public release; distribution is unlimited.			12b. Distribution Code. DTIC ELECTE DEC 04 1990 D D	
13. Abstract (Maximum 200 words). Satellite observations of the Mediterranean Sea reveal extremely complex circulation patterns which are highly time-dependent. This is in stark contrast to the simple idealized flow patterns presented in historical studies based on limited in situ observations. These pre-satellite studies were based on collections of data which were not synoptic in time nor space, and resulted in overly smooth idealized flow patterns. A series of process studies using a hierarchy of numerical ocean models has been undertaken in an attempt to elucidate the dynamics controlling the observed circulation. The numerical models used are variations of a multilayered primitive equations model. The simplest version is a one-active layer, reduced gravity model forced by winds, inflow/outflow mass flux and/or density variations. The results from this simplest version yields flow patterns which are qualitatively similar to the historical representations, but do not help to understand the highly time-dependent mesoscale variability observed in the remotely-sensed data. Adding additional complexities, such as multiple layers and thus allowing for baroclinic instabilities, bottom topography; realistic non-climatic wind stress, etc., increasingly adds to the realism of the numerical simulations. However, with the more complex models, it becomes increasingly evident that simple explanations for the causes of the observed mesoscale variability will not be forthcoming. By a systematic series of process studies, various responses to the specified forcing can be ascertained. The results to date reveal that no single forcing mechanism by itself can explain all the variability and in most cases a combination of forcing mechanisms are required to produce a simulation of the observed circulation patterns. <i>Key words: Ocean currents/models.</i>				
14. Subject Terms. (U) Tactical Scale Models; (U) Ocean Models; (U) Acoustic Models			15. Number of Pages.	
			16. Price Code.	
17. Security Classification of Report. Unclassified	18. Security Classification of This Page. Unclassified	19. Security Classification of Abstract. Unclassified	20. Limitation of Abstract. SAR	

-VI5

Process Studies of the Complex Mesoscale Circulation Observed in the Western Mediterranean Sea

George W. HEBURN

Naval Oceanographic & Atmospheric Research Laboratory Stennis Space Center, MS (U.S.A.)

Satellite observations of the Mediterranean Sea reveal extremely complex circulation patterns which are highly time-dependent. This is in stark contrast to the simple idealized flow patterns presented in historical studies based on limited in-situ observations. These pre-satellite studies were based on collections of data which were not synoptic in time nor space and resulted in overly smooth idealized flow patterns.

A series of process studies using a hierarchy of numerical ocean models has been undertaken in an attempt to elucidate the dynamics controlling the observed circulation. The numerical models used are variations of a multi-layered primitive equations model. The simplest version is a one-active layer, reduced gravity model forced by winds, inflow/outflow mass flux and/or density variations. The results from this simplest version yields flow patterns which are qualitatively similar to the historical representations, but do not help to understand the highly time-dependent mesoscale variability observed in the remotely-sensed data.

Adding additional complexities, such as multiple layers and thus allowing for baroclinic instabilities; bottom topography; realistic non-climatic wind stress, etc., increasingly adds to the realism of the numerical simulations. However, with the more complex models, it becomes increasingly evident that simple explanations for the causes of the observed mesoscale variability will not be forthcoming. By a systematic series of process studies, various responses to the specified forcing can be ascertained. The results to date reveal that no single forcing mechanism by itself can explain all the variability and in most cases a combination of forcing mechanisms are required to produce a simulation of the observed circulation patterns.



(cont)
→ circulation/patterns;
Mathematical models;
Acoustic data;
Flux rate/water flow.

(MM) ←

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Availability or Special
A-1	21
DOCUMENTLESS INPUT	