



Performances study of interferometric radar altimeters: from the instrument to the global mission definition

V. Enjolas (1,4), P. Vincent (2), J.C. Souyris (1), E. Rodriguez (3) , L. Phalippou (4), A. Cazenave (5)

(1,5) CNES, 18, av. Edouard Belin, 31400 Toulouse, France, (2) IFREMER, 155 rue Jean Jacques Rousseau, 92138 Issy les Moulineaux, France, (3) JPL, 4800 Oak Grove Drive, Pasadena CA 91109, United States, (4) ALCATEL SPACE, 28, av. Jean François Champollion, 31000 Toulouse, France, (5) LEGOS, 14, av. Edouard Belin, 31055 Toulouse, France (vivien.enjolas@hotmail.fr / Fax: +33 561-283422)

The main limitations of standard nadir-looking radar altimeters have been known for long. They include the lack of coverage (intertrack distance of typically 150 km for the T/P / Jason tandem), and the spatial resolution (typically 2 km for T/P and Jason), expected to be a limiting factor for the determination of mesoscale phenomena in deep ocean.

In this context, various solutions using off-nadir radar interferometry have been proposed to give an answer to oceanographic mission objectives ([1] and [2]). This paper addresses the performances study of this new generation of instruments, and dedicated mission.

A first approach is based on the Wide-Swath Ocean Altimeter (WSOA) expected to be implemented onboard Jason-2 in 2004 and now abandoned. Every error domain have been checked: the physics of the measurement, its geometry, the impact of the platform and the external errors like the tropospheric and ionospheric delays. We have especially shown the strong need to move to a sun-synchronous orbit and the non negligible impact of propagation media errors in the swath, reaching a few centimetres in the worst case. Some slight changes in the parameters of the instrument have also been discussed to improve the overall error budget.

The outcomes have led to the definition and the optimization of such an instrument

and its dedicated mission.

Keywords - altimetry, interferometry, error budget, system analysis, ocean, mesoscale