The Interaction Between Propagating Disturbances and Supercritical Marine Layers on the West Coast of the United States

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1. Project Activity:

Thirteen automated stations were constructed rather than purchased to have properties that were not easily incorporated in purchased stations at a better price. Improvements include minute averages, the highest accuracy commercially available pressure sensor in a remote station, aspirated temperature and humidity seasons and memory logged on flash cards. Stations deployed and maintained along the California coast and from 10 May through 15 October 1994. Twelve RAF C-130 flights were made along the central California Coast in July 1994 that was done by another cooperative project. Automated stations deployed and maintained along the West Coast between Piedras Blancas, CA to Gold Beach, OR from 12 May through 20 October 1996. Thirteen NCAR C-130 flights were made along California and Southern Oregon in June and July 1996 by the Principal Investigators but funded by NSF in coordination with this project. Papers have been published and are accepted for publication on the 1994 field season and the 1996 field season. Additional papers are in preparation on long gravity waves in the marine layer and the relation between surface wind divergence and marine layer clouds.

2. Scientific Results:

A trapped event was observed along the California Coast in the 1994 field season. It had a Kelvin wave-like response that was mostly contained in the marine inversion. At the sea surface, an atmospheric bore progressed to the north, trapped along the coast.

A major result of this study is the measurement of the summer atmospheric marine layer structure between central Oregon and California. This includes the coastal and buoy winds, the inversion base height, the inversion top height and inversion strength.

Our hypothesis is confirmed that the summer marine boundary layer along Southern Oregon and to past Point Conception California and beyond 124 W is supercritical or near supercritical a majority of the time. For every major cape and many minor capes, there is a supercritical expansion fan is on the southern side where the marine layer flow accelerates and thins. On the upwind side of every major cape is a compression bulge where the marine layer thickens and slows .

3. Journal Articles:

Winant, C.D. and C.E. Dorman, 1997: Seasonal patterns of surface wind stress and heat flux over the Southern California Bight. Journal Geophysical. Research. 102, 5641-5653.

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Dorma n, C.E., L.Armi, J.M. Bane, D.P. Rogers, 1998: Sea Surface Mixed Layer During the June 10-11, 1994 California Coastally Trapped Event. Monthly Weather Review, 126,600-619.

Rogers, D., C. Dorman, K. Edwards, I. Brooks, K.Melville, S. Burk, W. Thompson, T. Holt, L. Strom, M. Tjernstrom, B. Grisogono, J. Bane,W. Nuss, B. Morley, A. Schanot, 1998: Highlights of Coastal Waves 1996. Bulletin American Meteorological Society, 7, 1307-1326.

Ralph, F. M., L. Armi, J. M. Bane, C. E. Dorman, W. D. Neff, P. J. Neiman, W. Nuss, and P. O. G. Persson, 1998: Observations and analysis of the 10-11 June 1994 coastally trapped disturbance. Monthly Weather Review, 126, 2435-2465. Dorman, C.E., D. P. Rogers, W. Nuss and W. T.

Thompson, 1998: Adjustment of the Summer Marine Boundary Layer Around Pt. Sur, California. Monthly Weather Review, 127, 2143-2159.

Dorman, C.E., C.D. Winant, 1999: The Marine Layer In and Around the Santa Barbara Channel. Monthly Weather Review. In press Dorman ,C. E., T.

Holt, D. P. Rogers and K. Edwards, 1999: Large-Scale Structure of the June-July 1996 Marine Boundary Layer Along California and Oregon. Monthly WeatherReview. In Press.

4. Published Abstracts for Papers Given At National Meetings:

Dorman, C. E. and B. Grisogono, 1996: Adjustment of the Summer Marine Boundary Layer Flow around Pt Sur, California. Presented at AGU Fall Annual Meeting in San Francisco, Dec 15-19, 1996. Abstract in EOS, 77, Supplement. F118.

Grisogono, B. And C. E. Dorman, 1996: Modeling of the Summer Marine Atmospheric Boundary Layer Around Pt Sur, California. Presented at AGU Fall Annual Meeting in San Francisco, Dec 15-19, 1996. Abstract in EOS, 77, F118

Contreras, R., C. E. Dorman and C. D. Winant, 1996: The Marine Layer in the Pt Conception-santa Barbara Channel Area. Presented at AGU Fall Annual Meeting in San Francisco, Dec 15-19, 1996. Abstract in EOS, 77, Supplement. F128.

Strom, L, D. P. Rogers and C. E. Dorman, 1996: Topographic Forcing of the Atmospheric Boundary Layer During CW96. Presented at AGU Fall Annual Meeting in San Francisco, Dec 15-19, 1996. Abstract in EOS, 77, Supplement. F117.

Dorman, C. E., B. Grisogono, and D. P. Rogers, 1997: Long Gravity Waves in California's Summer Marine Boundary Layer. Presented at 12th Symposium on Boundary Layers and Turbulence in Vancouver, July 28-August 1, 1997. Abstract in: Preprints of 12th Symposium on Boundary Layers and Turbulence, American Meteorological Society, 342-343.

Dorman, C. E., D. P. Rogers, 1998; The Structure of Summer High Speed Winds Around Cape Mendocino, CA. Presented at 78th AMS Annual Meeting in Phoenix, 11-16 January 1998.

Dorman, C. E., 1998: Atmospheric Forcing of Circulation in the Santa Maria Basin. Presented at AGU Ocean Sciences Meeting in San Diego, February 9-13, 1998. Abstract in EOS, 79, Supplement. O40.

Dorman, C.E. and D.P. Rogers, 1999: The West Coast Marine Layer and Clouds in Coastal Waves 96. Presented at 13th Symposium on Boundary Layers and Turbulence in Dallas, 10-15 January 1999. Abstract in Preprints of 13th Symposium on Boundary Layers and Turbulence, American Meteorological Society, 411-413.

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