

- Transfer the atmospheric general circulation model of COLA (Center for Ocean-Land-Atmosphere studies) to PAOS. (Program of Atmospheric and Oceanic Sciences) of University of Colorado.
- Studying the turbulence energy transfer theory across the tropical air-sea interface with Dr. Robert Grossman.
- Developing tropical wave propagation theory in a inhomogeneous flow with Prof. Peter Webster.
- Set up the first email and Web server for the PAOS of University of Colorado.
- Build up and supervise the computer lab of the research groups of Prof. Peter Webster and Judith Curry.
- Supervising the computer Lab to make sure there are adequate hardware and software resource to support the ongoing researches.
- Supervising Ms. Anne Tseng to build up ERA15 and NCEP reanalysis database for our research group. The major works include download data from NCAR, changing data encoding scheme and change the data structure.
- Benchmark new hardware and software.
- Installing software package and upgrades.
- Installing and localizing new hardware.
- Troubleshooting network, hardware and software problems.
- Training new hires.
- Conducting research on the topics of tropical and extratropical teleconnections.
- Setting up an air-sea interaction model (Anderson and McCreary, 1984) to study the problems of El Nino and Southern Oscillation.
- Helping students to set up and diagnose their atmospheric/oceanic models.

Research Associate, Department of Meteorology, Pennsylvania State University, University Park, Pennsylvania 1985 - 1992

- Transferring the computers in our group from PC platform to workstation platform.
- Daily system administrating work.
- Study of mid-latitude mesoscale phenomena.
- Study of tropical, extratropical interactions.

Research Assistant, Department of Meteorology, Pennsylvania State University, University Park, Pennsylvania 1983-1985

- Study of small scale convections.
- Developing a two-way interactive nesting grid model for study the atmospheric mesoscale phenomena.

3. TEACHING EXPERIENCE

Meteorology 597 Special Research Course, Investigation of Organized Convection and Westerly Bursts in the Warm Pool Regions of the Tropics.

Meteorology597 Special Research Course, Large-scale Ocean Atmosphere Interaction (with C. Zhang).

Special Research Colloquia: Model Formulation in a UNIX- and C-environment.

APAS 7500 Air-sea interactions in tropical Pacific area (with P. Webster).

APAS 7500 Numerical methods used in atmospheric and oceanic Models (with T. Warner).

4. PUBLICATIONS

Quan, X.W., P.J. Webster, A.M. Moore and H.R. Chang, 2004: Seasonality in SST forced atmospheric short-term climate predictability. (accepted by *J.Clim.*)

Chang, H.R. and R.L. Grossman, 1999: Evaluation of bulk surface flux algorithms for light wind condition using data from COARE. ***Q.J.Roy.Met. Soc.***, 125, 1551-1588.

Webster, P.J. and H.R. Chang, 1997: Atmospheric wave propagation in heterogeneous flow: basic flow controls on tropical, extratropical interaction and equatorial wave modification. ***Dyn. of Oceans and Atmos.***, 27, 91-134.

Chang, H.R. and P.J. Webster, 1995: Energy accumulation and emanation at low latitudes. Part III: Forward and Backward accumulation. ***J. Atmos. Sci.***, 52, 2384-2403.

Webster, P.J. and H.-R. Chang, 1991: ***Structure of the Near-Equatorial Wind Field***, Vols. 1-4, 480pp.

Chang, H.-R. and P.J. Webster, 1990: Energy Accumulation and Emanation at Low Latitudes. Part II: Nonlinear Response to Strong Episodic Forcing. ***J. Atmos. Sci.***, 47, 2624-2644.

Webster, P.J. and H.-R. Chang, 1988: Energy Accumulation and Emanation at Low Latitudes: Impacts of a Zonally Varying Basic State. ***J. Atmos. Sci.***, 45, 803-829.

Zhang, D.L., H.-R. Chang, N.L. Seaman, T.T. Warner and J.M. Fritsch, 1986: A Two-way Interactive Nesting Procedure with Variable Terrain Resolution. ***Mon. Wea. Rev.***, 114, 1330-1339.

Chang, H.-R. and H.N. Shirer, 1985: Compact Spatial Differencing Techniques in Numerical Modeling. ***Mon. Wea. Rev.***, 113, 409-423.

Chang, H.-R. and H.N. Shirer, 1984: Transition in Shallow Convection: An Explanation for Lateral Cell Expansion. ***J. Atmos. Sci.***, 41, 2334-2346.

5. DISSERTATION

Chang, H.-R., 1983: *Comparison of Steady State Transitions in Truncated Spectral and Finite Difference Models of Two-dimensional Shallow Convection*. Ph.D. Dissertation, Pennsylvania State University, University Park, Pennsylvania, 175pp.

6. PRESENTATIONS

- Chang, H.-R. and P.J. Webster, 1992: "Atmospheric low frequency dynamics." Workshop

on *Recent Development on Meteorology and Climatology in East Asia*. 44-67.

- Webster, P.J. and H.-R. Chang, 1991: Structure of the Near-Equatorial Wind Field, Vols. 1-4, 480pp.
- Webster, P.J., H.-R. Chang and C. Zhang, 1989: "The Joint Interaction of the Tropics and Higher Latitudes: A Theoretical Basis for the Study of Monsoons." *Fourth US/PRC Monsoon Workshop*, State College, Pennsylvania.
- Webster, P.J., H.-R. Chang and C. Zhang, 1989: "Transmission Characteristics of the Dynamic Response to Episodic Forcing in the Warm Pool Regions of the Tropical Oceans." *Western Pacific Meeting and Workshop on TOGA COARE*, Noumea, New Caledonia.
- Webster, P.J., H.-R. Chang and C. Zhang, 1989: "Joint Interaction of the Tropics and Higher Latitudes: Some New Concepts." *Third International Conference on Southern Hemisphere Meteorology and Oceanography*, Buenos Aires, Argentina.
- Webster, P.J., H.-R. Chang, M. Dong and A. Samel, 1987: "Wave Accumulation and Emanation at Low Latitudes: Implications for Numerical Weather Prediction in the Tropical and Monsoonal Regions." *Proceedings: US/PRC Bilateral Monsoon Program*, Kunming, PRC.
- Seaman, N.L., H.-R. Chang, D.R. Stauffer and T.T. Warner, 1987: "Simulations of Mesoscale Meteorology with a Nest-grid Numerical Prediction Model." *Proceedings: Seventh Conference on Numerical Weather Prediction*, Montreal, Canada, American Meteorological Society, 251-258.
- Webster, P.J. and H.-R. Chang, 1986: "A New Theory of Fast and Slow Teleconnections. Part I: Theory." *Proceedings: Second International Conference on Southern Hemisphere Meteorology*, Wellington, New Zealand, American Meteorological Society, 414-418.
- Chang, H.-R. and H.N. Shirer, 1983: "Modeling Transitions in Shallow Convection." *Proceedings: Sixth Conference on Numerical Weather Prediction*, Omaha, Nebraska, American Meteorological Society, 385-392.