Y. TONY SONG

RESEARCH SCIENTIST

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Education

Ph.D., Applied Mathematics, Simon Fraser University (1990)
M.S., Applied Math, Chinese Academy of Sciences (1984)
B.S., Mathematics, Zhengzhou University (1981)

Research Interests

- Innovative remote sensing: Using GPS to detect tsunami scale and genesis; using GRACE Ocean-bottom-pressure to study ocean circulation
- Advanced ocean modeling: Developing S-coordinate system and pressure gradient schemes for community-user models, non-Boussinesq ROMS, and multi-scale fluid dynamics
- Coastal oceanography: Focusing on Asia Marginal Seas, flow interactions with topography, cross-shelf exchange, and coastal upwelling

Professional Experience

Jet Propulsion Laboratory (1998 – present):
  Research Scientist, Earth Science Section (2001—present)
  Senior Technical Staff, Ocean Science Element (1998–2001)
Bedford Institute of Oceanography: Research Associate (1996–1997)
Institute of Marine and Coastal Sciences, Rutgers University, New Jersey:
  Research Assistant Professor (1993–1996); Postdoctorial Fellow (1991–1993)

Awards and Patents

- Recipient of the 2008 **Ed Stone Award**
- NASA Tech Brief award # NPO44443-CN: *`Parallelization of the Coupled Earthquake-Tsunami Model`* (2007)
- Jet Propulsion Laboratory Outstanding Accomplishment Award for *Successful Utilizing Jason Sea Level Observations and Advanced Numerical Models to Study the 2004 Indian Ocean Tsunami* (2005)
- United State Copyright ©1996-2096 #TXu 715-315 for SCRUM (the S-Coordinate Rutgers University Mode, original developer)

Peer-Reviewed Publications

1. **Song, Y. T.** and V. Zlotnicki, The subpolar ocean-bottom-pressure oscillation and its links to ENSO, *Int. J. Remote Sensing*, in press, (2008).
2. **Song, Y. T**., L.-L. Fu, V. Zlotnicki, C. Ji, V. Hjorleifsdottir, C.K. Shum, and Y. Yi 2008: The role of horizontal impulses of the faulting continental slope in

generating the 26 December 2004 Tsunami, *Ocean Modell*. (2008), doi:10.1016/j.ocemod.2007.10.007**.**

3. **Song, Y. T**., Detecting tsunami genesis and scales directly from coastal GPS stations, *Geophys. Res. Lett*., **34**, L19602, doi:10.1029/2007GL031681 (2007).
4. Zheng, Q., H. Lin, J. Meng, X. Hu, and **Y. T. Song**, Sub-mesoscale Ocean Vortex Trains in the Luzon Strait, *J. Geophys. Res*., (in press), (2007).
5. Zlotnicki, V., J. Wahr, I. Fukumori, and **Y. T. Song**, The Antarctic Circumpolar Current: seasonal transport variablity during 2002-2005, *J. Phys. Oceanogr*., 37, doi:10.1175/JPO3009.1 (2006).
6. **Song, Y. T.**, Estimation of interbasin transport using ocean bottom pressure: Theory and model for Asian marginal seas, *J. Geophys. Res*., 111, C11S19, doi:10.1029/2005JC003189 (2006).
7. Zheng, Q., R. Dwi Susanto, Chung-Ru Ho, **Y. T. Song**, and Qing Xu, Statistical and dynamical analyses of generation mechanisms of solitary internal waves in the northern South China Sea, JGR-Oceans, 112, C03021, doi:10.1029/2006JC003551 (2006).
8. Zheng, Q., G. Fang, and **Y. T. Song**, Introduction to special section: Dynamics and circulation of the Yellow, East, and South China Sea, *J. Geophys. Res*., 111, C11S01, doi:10.1029/2005JC003261 (2006).
9. **Song, Y. T**. and T. Y. Hou, Parametric vertical coordinate formulation for multiscale, Boussinesq, and non-Boussinesq ocean modeling, *Ocean Modelling*. Doi:10.1016/j.ocemod.2005.01.001 (2006).
10. **Song, Y. T**., C. Ji, L.-L. Fu, V. Zlotnicki, C.K. Shum, Y. Yi, and V. Hjorleifsdottir, The 26 December 2004 Tsunami Source Estimated from Satellite Radar Altimetry and Seismic Waves, *Geophys. Res. Lett*., **23**, doi:10.1029/2005GL023683, (2005).
11. Wang, P., **Y. T. Song**, Y. Chao, and H. Zhang, Parallel computation of the Regional Ocean Model System (ROMS), *International Journal of High Performance Computing Applications*, Volume 19, No. 4, 375-385, UCRL-JRNL-211096 (2005).
12. **Song, Y. T.** and V. Zlotnicki, Ocean bottom pressure waves predicted in the tropical Pacific, *Geophys. Res. Lett.*, Vol. 31, No. 5, L05306, 10.1029/2003GL018980, (2004).
13. Glenn, S. M., Arnone, R., Bergmann, T., Bissett, W. P., Crowley, M., Cullen, J., Gryzmski, J., Haidvogel. D., Kohut, J., Moline, M. A., Oliver, M., Orrico, C., Sherrell, R., **Song, Y. T**., Weidemann, A., Chant, R., Schofield, The Biogeochemical impact of summertime coastal upwelling in the Mid-Atlantic Bight. *J. Geophys. Res*., **109** (C12S02), DOI:10.1029/2003JC002265 (2004).
14. **Song, Y. T.** and Y. Chao, The role of topography in coastal upwelling and cross-shore exchange: A theoretical study, *Ocean Modelling*, **6**(2), 151-176 (2004).
15. **Song, Y. T**. and T. Tang, 2002: Eddy-resolving simulations for the Asian marginal seas and Kuroshio using the nonlinear-terrain following coordinate system, *J. Korean Oceanogr*., **37**(3), 167-177.
16. **Song, Y. T**., D. Haidvogel, and S. Glenn, 2001: The effects of topographic variability on the formation of upwelling centers off New Jersey: A theoretical model, *J. Geophys. Res*. **106**, 9223-9240.

17. **Song, Y. T**. and Y. Chao, 2000: An embedded bottom boundary layer formulation for z-coordinate ocean models, *J. Atmos. Oceanic Te*ch., **17**, 546-560.
18. **Song, Y. T**. 1998: A general pressure gradient formulation for ocean models. Part I: Scheme design and diagnostic analysis, *Monthly Weather Review*, **126**, 3213-3230.
19. **Song, Y. T**. and D. Wright, 1998: A general pressure gradient formulation for ocean models. Part II: Energy, momentum, and bottom torque consistency, *Monthly Weather Review*, **126**, 3231-3247.
20. Glenn, S., M. Crowley, D. Haidvogel, and **Y. T. Song**, 1996: Underwater observatory captures coastal upwelling events off New Jersey, *EOS Trans. Amer. Geophys. Union*, **77**, 233, 236.
21. Lardner, R. W. and **Y. Song**, 1995: Optimal estimation of eddy viscosity and friction coefficients for a quasi-three-dimensional numerical tidal model, *Atmosphere-Ocean*, **33**, 581-611.
22. **Song, Y**. and T. Tang, 1994: On staggered Turkel-Zwas type schemes for the two-dimensional shallow water equations. *Monthly Weather Review*, **122** (1), 223-234.
23. **Song, Y**. and D. Haidvogel, 1994: A semi-implicit primitive equation ocean circulation model using a generalized topography-following coordinate system. *J. Comput. Phys.*, **115**, 228-244. (**This paper has been cited over 160 times as of 2007.**)
24. **Song, Y.**, S. L. Das, and R. W. Lardner, 1994: Computation of density driven flows using the spectral method: Application to the Arabian Gulf. *Cont. Shelf Res.*, **14**, 1039-1052.
25. **Song, Y**. and D. Haidvogel, 1993: Numerical simulations of California Current System under the joint effect of coastal geometry and surface forcing, in M.L.Spaulding et al. (eds). *Estuarine and Coastal Modeling*, **3**, 216-234.
26. **Song, Y**. and T. Tang, 1993: Dispersion and group velocity in numerical schemes for three-dimensional hydrodynamic equations. *J. Comput. Phys.*, **105**, 72-82.
27. Lardner, R. W. and **Y. Song**, 1992: A comparison of spatial grids for numerical modeling of lows in near-coast seas, *Int. J. Numer. Methods. Fluids*, **14**, 109-124.
28. Lardner, R. W. and **Y. Song**, 1992: A hybrid spectal method for the three-dimensional numerical modeling of nonlinear flows in shallow seas, *J. Comput. Phys.*, **100**, 322-334.
29. Lardner, R. W. and **Y. Song**, 1991: An Algorithm for three-dimensional convection and diffusion with very different horizontal and vertical length scales, *Int. J. Numer. Methods Engineering.*, **32**, 1303-1319.
30. **Song, Y**. and M. Yang, 1986: Spectral approximation theory for multigroup neutron transport operators, *Acta Mathematica Scientia*, 6 (3), 339-352.
31. Zheng, S. and **Y. Song**, 1985: Characteristics of p>1-order quasi-collectively compact operator and its applications, *Science bulletin* (in Chinese), **12**, 896-900.
32. **Song, Y**., 1983: A non-linear singular Sturm-Liouville problem, *Journal of Zhengzhou University* (published in college), **1**, 35-39.