

## Curriculum Vitae

### Mr. Tapani Stipa

Born 1968-01-12

#### Posts and positions

Research group leader, Finnish Meteorological Institute, 1/2009-

scientist, research group leader Finnish Institute of Marine Research, 4/2000–12/2008

visiting scientist Meteorological Institute, Stockholm University, Jan-Apr 2000

visiting scientist Massachusetts Inst. of Technology/EAPS (prof. John Marshall) Oct–Dec 1997

research scientist Department of Geophysics, Univ. of Helsinki 5/1997–2/2000

conscription service 5.2.1996–5.3.1997

research scientist Tvärminne Zool. Station UH 1992–1995

research assistant Dept. of Geophysics, UH 1989, 1990, Finnish Institute of Marine Research 1991

#### Leadership and participation in major projects, research grants

currently leads an operational modelling group

coordinator MERCW (Modelling the environmental effects of sea-dumped chemical weapons), EU FP6 project (2.8 Meuro)

coordinator ShipNODeff - program to analyse ship-borne emissions to the atmosphere

- ShipNOEm first automatic emission inventory in Europe (MINTC, FMA funding 110 keuro in 2006-2008)
- ShipNODep Finnish-Estonian Interreg IIIa project to establish an operational air quality modelling and validation capability (400 keuro)

Chair of executive committee Finland-Thailand feasibility study of early warning systems—FinnEWS ( 1.1 M, 2005-2006)

EU GMES Marine Core Service (2009-2011) Finnish contact person.

#### Participation in projects:

DAMOCLES Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies – taking part in building intelligent and models into robotic instrumentation society

Mersea-Strand 1 Marine Environment and Security for the European Area - A GMES initial stage project (EU 2003- 6/2004)

HABILE Harmful Algal Bloom Initiation and Prediction in Large European Marine Ecosystems. (EU 2002-2004)

White Sea An INCO/Copernicus project to study the economically feasible protection for the White Sea (EU 2001-2002)

PAPA Co-operation project in operational modelling of the Baltic Sea area (EU 2003-2005)

SWARM Autonomous Underwater Multi-Probe System for Coastal Area / Shallow Water Monitoring (EU 2003-2005)

**National research funding:**

research grant Maj and Tor Nessling Foundation, 1997,1998,1999,2000

mobility grant Nordiska Forskerutdanningsakademin, 1998, 4 months

invitation grant (Estonia) Finnish Academy of Sciences, 2001

invitation grant (Russia) Finnish Academy of Sciences, 2002,2003,2004,2005

**Supervised academic theses**

Tuomo Saloranta Nat. Cand. thesis 1995 (Dept. of Geophysics, University of Helsinki)

Antti Lindfors M. Sc. thesis 1999 (Dept. of Geophysics, University of Helsinki)

Hanna Virta M. Sc. thesis 2000 (Dept. of Geophysics, University of Helsinki)

Antti Westerlund M.Sc. thesis 2005 (Dept. of Physics, University of Helsinki)

**Positions of trust, duties as scientific expert**

Intergovernmental Oceanographic Commission (IOC) Finnish delegate

iGOOS –intergovernmental panel for the global ocean observing system: national representative

EuroGOOS National representative 2005-

Intergovernmental Oceanographic Commission Head of delegation: Executive council 2006, Tsunami meeting Paris 2005; delegate Mauritius 2005

Phuket ministerial meeting following the Boxing day tsunami; delegate, Phuket 29.-30.1.2005

European Science Foundation member of the Marine Board Working Group for Innovative Modelling of Shelf Areas 2003-2005

WWF Finland member of the advisory group for the Baltic Sea

ICES member of the Working Group for Physical and Biological Interactions, several other working groups

ICES member of the Marine Habitat Committee (2002), Oceanography Committee (2003–) cruise leader R/V Aranda, R/V Saduria (about 200 days)

President 1989, international secretary 1987–1988 for Limes ry, association for students of natural sciences at the University of Helsinki (1500 members)

diving instructor CMAS M2, instructed close to ten recreational and professional diving courses since 1993 as well as a number of diving expeditions

workshops Co-convenor for the Inflow workshop in the Baltic Sea Science Congress 2003, operational oceanography session in ICES annual science conference 2006

refereeing in scientific journals Geophysical Research Letters, Boreal Environment Research, Journal of Marine Systems, Journal of Geophysical Research, Ambio, Geophysica, Deep-Sea Research, Journal of Physical Oceanography

## **Education**

Docent University of Helsinki, 2004–

PhD Meteorological Institute, Stockholm University, 6/2002, title of thesis “Freshwater, density gradients and biological processes in cold, brackish seas: Aspects of the biogeophysical fluid dynamics characterising the Baltic Sea”

Lic.Phil. Department of Geophysics, University of Helsinki, 1999, grade ecl

Candidate of Philosophy , geophysics, University of Helsinki 1994 (good/excellent knowledge; pro gradu eximia cum laude approbatur)

Undergraduate university studies 1986–1994 University of Helsinki (physics, theoretical physics, computer science, geophysics), 1989–1991 University of Oulu (biophysics, biology, chemistry), about 230 credits

Matriculation examination 1986, grade Laudatur 36/36 votes (placements 1–24 in national high school physics, maths and chemistry competitions)

## **Key scientific interests**

1. geophysics in service of the information society
2. coupled biogeophysical fluid dynamics
3. coastal processes
4. high-performance numerical ocean-atmosphere models
5. climate variations and their effects in high latitudes

## 6. novel environmental instrumentation

Total number of publications in the past 10 years: ca. 50

### **Refereed international publications:**

Elken, Jüri, Pentti Mälkki, Pekka Alenius, and Tapani Stipa. 2006. Large halocline variations in the Northern Baltic Proper and associated meso- and basin-scale processes. *Oceanologia* 48: 1-17.

Kuzmina, N. P., V. M. Zhurbas, B. Rudels, T. Stipa, V. T. Paka, and S. S. Muraviev. 2008. Role of eddies and intrusions in the exchange processes in the Baltic halocline. *Oceanology* 48, no. 2: 149-158.

Kuzmina, Natalia, Bert Rudels, Tapani Stipa, and Victor Zhurbas. 2005. The Structure and Driving Mechanisms of the Baltic Intrusions. *Journal of Physical Oceanography* 35, no. 6: 1120-1137.

Leppäranta, Matti, Zhang Zhanhai, Jari Haapala, and Tapani Stipa. 2001. Sea-ice kinematics measured with GPS drifters. *Annals of Glaciology* 33: 151-156.

Stipa, Tapani. 1996. *Water Renewal and Vertical Circulation in Pohja Bay*. Report Series in Geophysics. FIN-00014 University of Helsinki: Department of Geophysics.

---. 1999. Water exchange and mixing in a semi-enclosed coastal basin (Pohja Bay). *Boreal Environment Research* 4: 307-317.

---. 2002a. Temperature as a passive isopycnal tracer in cold, spiceless oceans. *Geophys. Res. Lett.* 29, no. 20: 10.1029/2001GL014532.

---. 2002b. The dynamics of the N/P ratio and stratification in a large nitrogen-limited estuary as a result of upwelling: a tendency for offshore *Nodularia* blooms. *Hydrobiologia* 487: 219-227.

---. 2004a. On baroclinic neutrality in the Finnish Coastal Current. *Tellus* 56A: 79-87.

---. 2004b. The vernal bloom in heterogeneous convection: a numerical study of Baltic restratification. *Journal of Marine Systems* 44: 19-30.

Stipa, Tapani, Timo Tamminen, and Jukka Seppälä. 1999. On the creation and maintenance of stratification in the Gulf of Riga. *Journal of Marine Systems* 23: 27-49.

Stipa, Tapani, and Jenni Vepsäläinen. 2002. The fragile climatological niche of the Baltic Sea. *Boreal Environment Research* 7, no. 4: 335-342.

Vepsäläinen, J., T. Pyhälähti, E. Rantajärvi, K. Kallio, S. Pertola, T. Stipa, M. Kiirikki, J. Pulliainen, and J. Seppälä. 2005. The combined use of optical remote sensing data and unattended flow-through fluorometer measurements in the Baltic Sea. *International Journal of Remote Sensing* 26, no. 2: 261 - 282. <http://www.informaworld.com/10.1080/01431160410001723718>.

Zhurbas, V. M., T. Stipa, P. Mälkki, V. T. Paka, and N. P. Kuz'mina. 2004. Mesoscale Variability of the Upwelling in the Southeastern Baltic Sea: IR Images and Numerical Modeling. *Okeanologiya* 44, no. 5: 495-504.

Zhurbas, Victor, Tapani Stipa, Pentti Mälkki, Vadim Paka, Nikolai Golenko, Inga Hense, and Vladimir Sklyarov. 2004. Generation of Mesoscale Eddies, Squirts and Mushroom Structures in the southeast Baltic Sea: Observations and Numerical Experiments. *Journal of Geophysical Research* 109.

**More comprehensive list of publications:**

Anniina Kiiltomäki, A. Lehmann, T. Stipa, and V. Fleming-Lehtinen. 2007. Statistical Analysis of Surface Temperature and Salinity Variability of the Baltic Sea – A Comparison of Observations and Model Data. In *Fifth study conference on BALTEX, Conference Proceedings*. Kuressaare, Saaremaa, Estonia, June 4.

Elken, Jüri, Pentti Mälkki, Pekka Alenius, and Tapani Stipa. 2006. Large halocline variations in the Northern Baltic Proper and associated meso- and basin-scale processes. *Oceanologia* 48: 1-17.

Haapala, Jari, Antti Herlevi, Matti Leppäranta, Tapani Stipa, and Zhanhai Zhang. 1999. Local ice cover deformation and mesoscale ice dynamics: report from the "Ice State" project. In , 277-301. Helsinki University of Technology. Ship Laboratory. M-242.

Haapala, Jari, and Tapani Stipa. 1997. GPS drifters. In *ZIP--97 data report*, ed. Jari Haapala and Matti Leppäranta, 59-69. Report Series in Geophysics. Department of Geophysics, University of Helsinki.

Hense, Inga, and Tapani Stipa. 2003a. *Bloom development of the primary producers in the Baltic Sea*.

---. 2003b. Interannual and spatial variations in the cyanobacteria bloom development in the Baltic Sea. In *Baltic Sea Science Congress 2003, Helsinki, Finland, August 24-28, 2003: abstract publication*, ed. Saara et al Bäck, 135.

J. Vepsäläinen, T. Pyhälähti, E. Rantajarvi, K. Kallio, S. Pertola, T. Stipa, M. Kiirikki, J. Pulliainen, and J. Seppälä. The combined use of optical remote sensing data and unattended flow-through fluorometer measurements in the Baltic Sea.

<http://www.informaworld.com/smpp/content~content=a714033155~db=all>.

Jalkanen, Jukka-Pekka, and Tapani Stipa. 2008. Helcom : Emissions from the Baltic Sea shipping in 2006. *Emissions from the Baltic Sea shipping in 2006*.

[http://www.helcom.fi/environment2/ifs/ifs2008/en\\_GB/ship\\_emissions/](http://www.helcom.fi/environment2/ifs/ifs2008/en_GB/ship_emissions/).

Kahma, Kimmo K., Heidi Pettersson, Tapani Stipa, Ulf Högström, Ann-Sofi Smedman, and Hans Bergström. 1997. *Comparison of wind stress hindcast by a coupled atmospheric-wave model (ECAWOM) and the measured wind stress at Östergarnsholm*. Technical Report. Helsinki.

Kuzmina, Natalia, Bert Rudels, Tapani Stipa, and Victor Zhurbas. 2005. The Structure and Driving Mechanisms of the Baltic Intrusions. *Journal of Physical Oceanography* 35, no. 6: 1120-1137.

Launiainen, Jouko, Tapani Stipa, Hannu Grönvall, and Timo Vihma. 1992. Finnish Lagrangian current experiments. In *The Gulf of Bothnia Year 1991. Physical transport experiments*, ed. Raj Murthy, Bertil Håkansson, and Pekka Alenius, 55-66. SMHI Reports Oceanography. Norrköping: Swedish Meteorological and Hydrological Institute.

- Leppäranta, Matti, Zhang Zhanhai, Jari Haapala, and Tapani Stipa. 2001. Sea-ice kinematics measured with GPS drifters. *Annals of Glaciology* 33: 151-156.
- Letizia Tedesco, M. Vichi, J. Haapala, and T. Stipa. 2007. Set Up of a Thermodynamic Model of Snow, Snow Ice and Sea Ice Evolution to be Coupled with a Biogeochemical Flux Model. In *Fifth Study Conference of BALTEX, Conference Proceedings*. Kuressaare, Saaremaa, Estonia, June 4.
- Lignell, Risto, and Tapani Stipa. 2004. Itämeren ravinerajoitteisuudesta. *Vesitalous*, no. 6: 23-27.
- Niiranen, S., T. Stipa, A. Hirvonen, J. P. Paakkonen, and A. Norkko. 2008. Modelled bioaccumulation of chemical warfare agents within the Baltic Sea food web. In *US/EU-Baltic International Symposium, 2008 IEEE/OES*, 1-10.
- Poutanen, Markku, and Tapani Stipa. 2000. Temporal and spatial variation of the sea surface topography of the Baltic Sea. In *Gravity, Geoid and Geodynamics, Banff, Alberta, Canada, July 31--August 5*.
- Rantajarvi, Eija, Tapani Stipa, Samuli Neuvonen, Tapio Suominen, Seppo Kaitala, Harri Kankaanpää, Jukka Seppälä, Matti Perttilä, Mika Raateoja, and Hannu Haahti. Alg@line in 2010? In , 22.
- Rantjärvi, Eija, ed. 2003. *Alg@line in 2003: 10 years of innovative plankton monitoring and research and operational information service in the Baltic Sea*. Meri. Finnish Institute of Marine Research.
- Rantjärvi, Eija, Lotta Ruokanen, Seija Hällfors, Juha Flinkman, Tapani Stipa, Tapio Suominen, Seppo Kaitala, and Petri Maunula. Alg@line today. In , 9-16.
- Stipa, Tapani. 1993. Mesoskaalan dynamiikasta (On mesoscale dynamics). In *Hydrosfäärin fysiikan jatkokoulutusseminaari (Licentiate seminar on hydrospheric physics)*, ed. Matti Leppäranta, 6:76-86. Seminaarisarja. University of Helsinki: Department of Geophysics.
- . 1994. On The Deep-Water Renewal of a Finnish Coastal Sill Basin. Department of Geophysics.
- . 1996. *Water Renewal and Vertical Circulation in Pohja Bay*. Report Series in Geophysics. FIN-00014 University of Helsinki: Department of Geophysics.
- . 1997. Resolving the Finnish coastal current. In , 15: Annales Geophysicae.
- . 1998a. Vastine artikkelille "Itämereltä Saaristomereen tulevan fosfori- ja typpikuormituksen arviointi kolmiulotteisen virtausmallin avulla". *Vesitalous* 39, no. 6: 37-38.
- . 1998b. On spring restratification in temperate and subarctic estuaries. In *ICES International Symposium on Brackish Water Ecosystems, 25.-28.8. Book of Abstracts*, 46. PO Box 33, FIN-00931 Helsinki: Finnish Institute of Marine Research, August.
- . 1999a. Instabilities and along-shore variability in the Finnish coastal current. In *4th workshop on physical processes in natural waters, 13-17 September 1999 Roosta, Estonia*, 10:62-66. Report series. Tallinn: Estonian Marine Institute.

- . 1999b. Kerrostuminen, mausteisuus ja hytinä Itämerellä. In *XIX Geofysiikan Päivät Sodankylässä 14.--15.6.1999*, ed. Johannes Kultima and Jyrki Manninen, 145-148. Oulu: Finnish Geophysical Society.
- . 1999c. *Kumpuamisen fysiikkaa ja kemiaa*.
- . 1999d. On the (non)conservation of mass in PE ocean models. In *Workshop on the modeling of the marine-atmospheric boundary layer, Helsinki 7.--8.12. 1998*, ed. Heidi Pettersson and Laura Rontu, 47-52. Finnish Institute of Marine Research.
- . 1999e. On the dynamics of unstable coastal currents: an IPV perspective. In *International conference : Fluxes and structures in fluids*, ed. Yu. D. Chashechkin, 124-126. Sanct Petersburg : Educational Centre "Lakhta" , 1999.
- . 1999f. Some new implications of freshwater forcing to stratification conditions in the Baltic Sea. Licentiate thesis, Department of Geophysics, University of Helsinki.
- . 1999g. Water exchange and mixing in a semi-enclosed coastal basin (Pohja Bay). *Boreal Environment Research* 4: 307-317.
- . 2000a. *BB-ADCP measurements on R/V Aranda: Data report for the DIAMIX winter experiment 1999*. WWW Notes in Geophysics. Helsinki: Department of Geophysics, University of Helsinki.
- . 2000b. Ravinnerajoitteisuus, rannikon sekoittumisotot ja mallien kalibrointi. *Vesitalous* 3/2000, no. 3: 23-28.
- . 2001a. Heat anomalies are driven by freshwater fluxes in the shivering Baltic. In *Third study conference of BALTEX*, ed. Jens Meywerk, 221-222. International BALTEX secretariat publication series. GKSS Research Center, Max Plank Stra\sse, D-21502 Geesthacht.
- . 2001b. Leväkukinnat, merten pilvet---meren ja ilmakehän välillä on monia yhtäläisyyksiä. In *Vuosikertomus---Annual Report, 2000:28-30*. Merentutkimuslaitos---Finnish Institute of Marine Research.
- . 2002a. Temperature as a passive isopycnal tracer in cold, spiceless oceans. *Geophys. Res. Lett.* 29, no. 20: 10.1029/2001GL014532.
- . 2002b. The dynamics of the N/P ratio and stratification in a large nitrogen-limited estuary as a result of upwelling: a tendency for offshore \emph{Nodularia} blooms. *Hydrobiologia* 487: 219-227.
- . 2002c. Freshwater, density gradients and biological processes in cold, brackish seas: Aspects of the biogeophysical fluid dynamics characterising the Baltic Sea. Department of Meteorology, Stockholm University, June.
- . 2004a. On baroclinic neutrality in the Finnish Coastal Current. *Tellus* 56A: 79-87.
- . 2004b. On the sensitivity of coastal quasigeostrophic edge wave interaction to bottom boundary characteristics: possible implications for eddy parameterizations. *ArXiv physics*: 0401119.

---. 2004c. The vernal bloom in heterogeneous convection: a numerical study of Baltic restratification. *Journal of Marine Systems* 44: 19-30.

Stipa, Tapani, Vivi Fleming, Urmas Lips, Lauri London, Jenni Vepsäläinen, Emil Nyman, and Eija Rantajärvi. Examples of applied scientific use of Alg@line data sets. In , 18-21.

Stipa, Tapani, Inga Hense, Maria Laamanen, and Jaana Lehtimäki. 2004. Parameterisation of temperature- and salinity-dependent growth rates for *Nodularia* and *Aphanizomenon* spp.

Stipa, Tapani, Jukka-Pekka Jalkanen, Marke Hongisto, Juha Kalli, and Anders Brink. 2007. *Emissions of NOx from Baltic shipping and first estimates of their effects on air quality and eutrophication of the Baltic Sea*. Helsinki: Finnish Institute of Marine Research.  
[http://www.shipnodeff.org/images/stories/nox\\_emissions\\_baltic\\_isbn978-951-53-3028-4.pdf](http://www.shipnodeff.org/images/stories/nox_emissions_baltic_isbn978-951-53-3028-4.pdf).

Stipa, Tapani, and Harri Kuosa. 2000. Silicate control of spring diatoms cascades to control of cyanobacterial blooms. In *Man and the Baltic Sea---Third Environment Symposium*, 47. Helsinki, October 2.

Stipa, Tapani, and Antti Lindfors. 1998. Instabilities and along-shore variability in the Finnish coastal current. In *ICES International Symposium on Brackish Water Ecosystems, 25.-28.8. 1998. Book of Abstracts*, 46. PO Box 33, FIN-00931 Helsinki: Finnish Institute of Marine Research.

Stipa, Tapani, Jukka Seppälä, and Timo Tamminen. 1995. Material fluxes across the entrance to the Gulf of Finland.

Stipa, Tapani, Jukka Seppälä, Timo Tamminen, and Harri Kuosa. 2000. Kevätkukinta syö eväitä sinileviltä. *Helsingin Sanomat* 13.5.: C16.

Stipa, Tapani, Morten Skogen, Ian Sehested Hansen, Anders Eriksen, Inga Hense, Anniina Kiiltomäki, Henrik Sjøiland, and Antti Westerlund. 2003. Short-term effects of nutrient reductions in the North Sea and Baltic Sea as seen by an ensemble of numerical models. *Meri - Report Series of the Finnish Institute of Marine Research* 49: 43-70.

Stipa, Tapani, Timo Tamminen, and Jukka Seppälä. 1999a. On the creation and maintenance of stratification in the Gulf of Riga. *Journal of Marine Systems* 23: 27-49.

---. 1999b. Restratification in the Gulf of Riga. In *2nd Nordic Marine Sciences Meeting, Hirtshals 2-4 March 1999: abstracts*, ed. Birger Larsen, 106. København: Print Geus.

Stipa, Tapani, and Jenni Vepsäläinen. 2002. The fragile climatological niche of the Baltic Sea. *Boreal Environment Research* 7, no. 4: 335-342.

Stipa, Tapani, Antti Westerlund, and Anniina Kiiltomäki. 2004. Ecosystem prediction in a cold, brackish sea; New scientific results, increased requirements for monitoring of the Baltic Sea. *Journal of Marine Systems*.

Tedesco, L. SIM2: a numerical model of sea-ice halo-thermodynamics for biogeochemical studies.



Tedesco, L., M. Vichi, J. Haapala, and T. Stipa. 2007. Development of a numerical model of sea ice for biogeochemical studies. Part 1: Sea-ice thermodynamics.

---. 2008. An enhanced sea-ice thermodynamic model applied to the Baltic Sea.

Tedesco, Letizia, Marcello Vichi, Jari Haapala, and Tapani Stipa. A 1-D sea ice thermodynamic model for biogeochemical studies. *Boreal Environment Research* (submitted).

Vepsäläinen, Jenni, T. Pyhälähti, E. Rantajärvi, K. Kallio, S. Pertola, T. Stipa, M. Kiirikki, J. Pulliainen, and Jukka Seppälä. 2005. The combined use of optical remote sensing data and unattended flow-through fluorometer measurements in the Baltic Sea. *International Journal of Remote Sensing* 26, no. 2: 261 - 282.

<http://www.informaworld.com/10.1080/01431160410001723718>.

Zhang, Z. H., M. Leppäranta, J. J. Haapala, and T. Stipa. 1999. Numerical simulation of sea ice drift in the Bay of Bothnia. In *Proceedings of the 15th international conference on port and ocean engineering under arctic conditions*, 2:488-497. Helsinki: Helsinki University of Technology, Ship Laboratory, August 23.

Zhurbas, V. M., T. Stipa, P. Mälkki, V. T. Paka, and N. P. Kuz'mina. 2004. Mesoscale Variability of the Upwelling in the Southeastern Baltic Sea: IR Images and Numerical Modeling. *Okeanologiya* 44, no. 5: 495–504.

Zhurbas, Victor, Tapani Stipa, Pentti Mälkki, Vadim Paka, Nikolai Golenko, Inga Hense, and Vladimir Sklyarov. 2003. Generation of Mesoscale Eddies, Squirts and Mushroom Structures in the Southeast Baltic Sea: Observations and Numerical Experiments. In *Proceedings of the First International Symposium for the Results from the PEACE*.

---. 2004. Generation of Mesoscale Eddies, Squirts and Mushroom Structures in the southeast Baltic Sea: Observations and Numerical Experiments. *Journal of Geophysical Research* 109.