GETM

A General Estuarine Transport Model

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Coastal modelling challenges I

- **Drying and flooding algorithm** for simulation of Wadden Sea areas.
- **Bottom-fitted coordinates** for better representing near-bed currents.
- **Surface-fitted coordinates** for fine near-surface resolution at high tidal range.
- **General vertical coordinates** for better fitting the model grid to internal structures.

Coastal model challenges II

- **Flexible horizontal coordinates** for better representing complex bathymetry and higher resolutions of specific regions without nesting.
- **Monotone high-order advection schemes** for better representing fronts and stratification.
- **Higher order turbulence models** for good representation of vertical mixing.

Why a new 3D model?

	Vertical discretisation	Horizontal discretisation	Barotropic time-stepping	High-order turbulence closures	Drying/Flooding	Public Domain
MOM-4	z	CU	MSP	N	N	Y
POM	s	CU	MSP	Y	N	Y
ROMS	s	CU	MSP	Y	N	Y
POL3DB	s	CA	MSP	Y	N	Y
GHER-M	$2-\sigma$	CA	MSP	Y	N	Y
COHERENS	σ	CA	MSP	Y	N	Y
TRIM-3D	z	CA	IMP	N	Y	N
MIKE-3	z	CA	ADI	Y	N	N
TELEMAC-3D	σ	FE	IMP	Y	Y	N
ECOM	s	CU	IMP	Y	Y	Y
MOHID	s	CA	ADI	Y	Y	Y
GETM	s	CU	MSP	Y	Y	Y

Turbulence Models in GETM

http://www.gotm.net

- Challenge
- Aim
- The Idea
- Key features
- Software
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- Test cases
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- How to run?
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- User Group
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- Who's Who?
- Guestbook

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GOTM is a one-dimensional numerical model developed and supported by a core team of ocean modellers. GOTM aims at simulating accurately vertical exchange processes in the marine environment where mixing is known to play a key role. GOTM is freely available under the GPL (Gnu Public License).

The interested user can download the source code, a set of test cases (Papa, November, Flex, ...) and a comprehensive report.

You are warmly invited to join the GOTM mailing list and send any comments/questions to the GOTM team or become a GOTM contributor. The GOTM developers are grateful to their sponsors.

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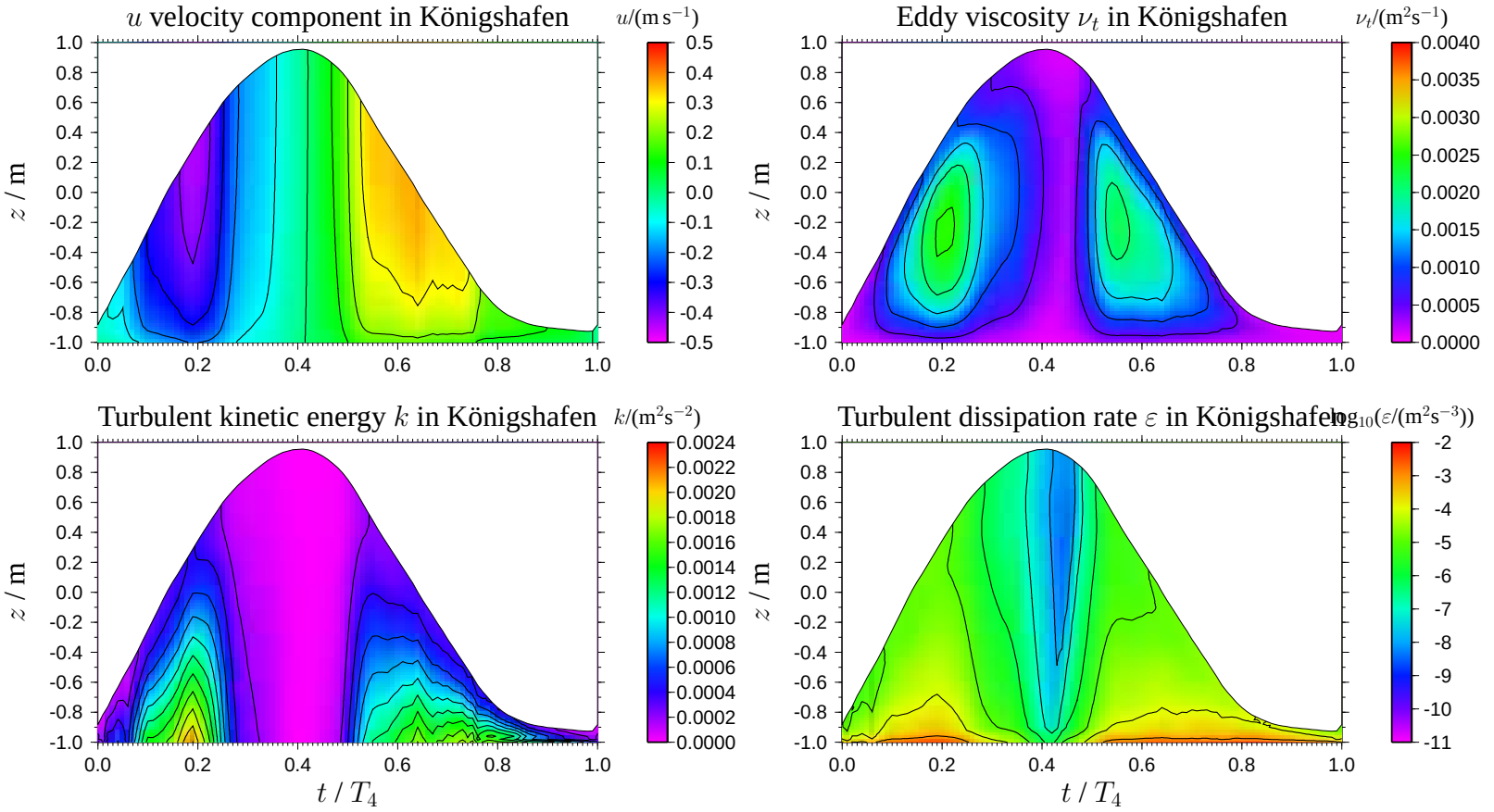
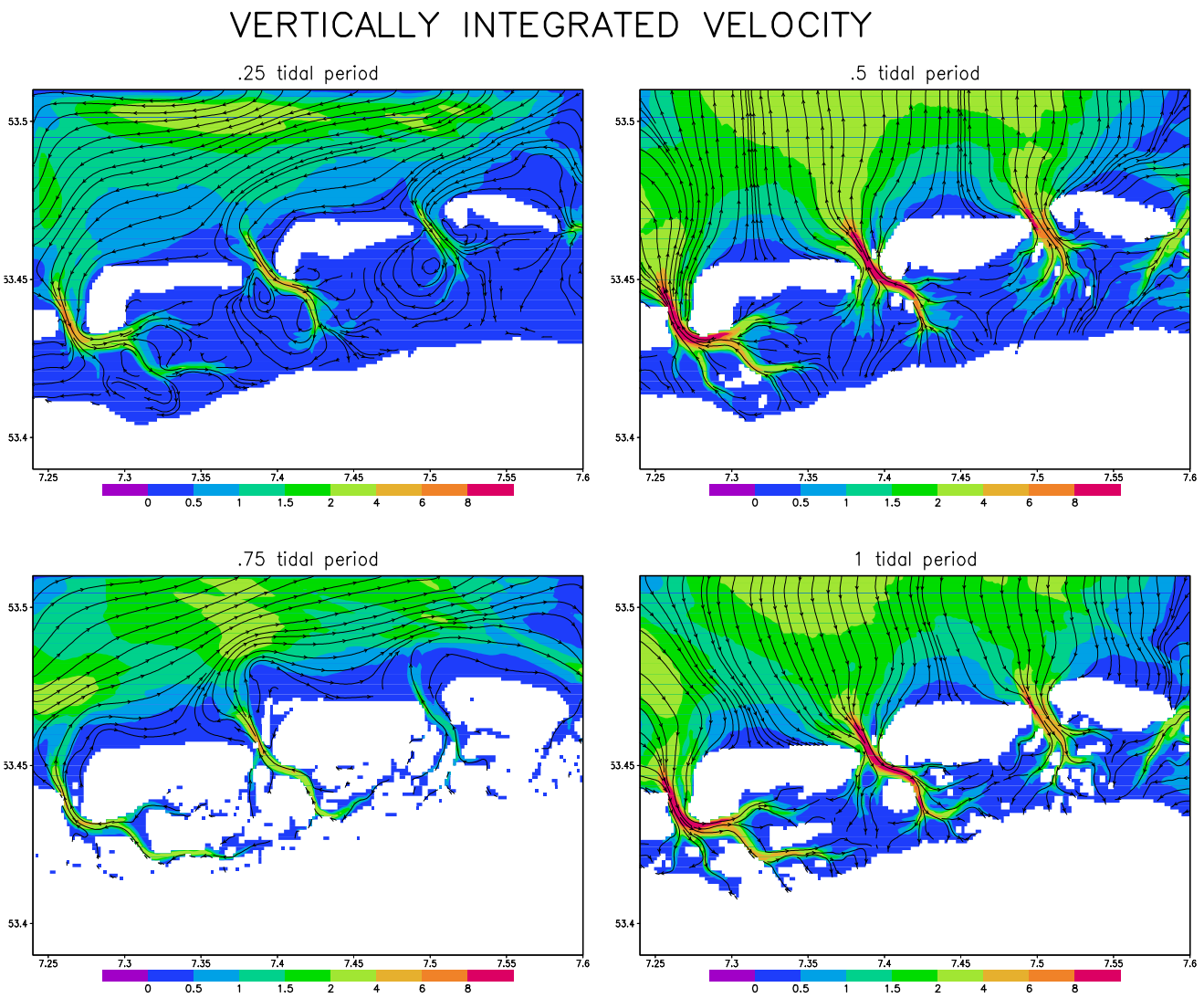
Baltic Sea Research Institute Warnemünde

North Frisian Wadden Sea



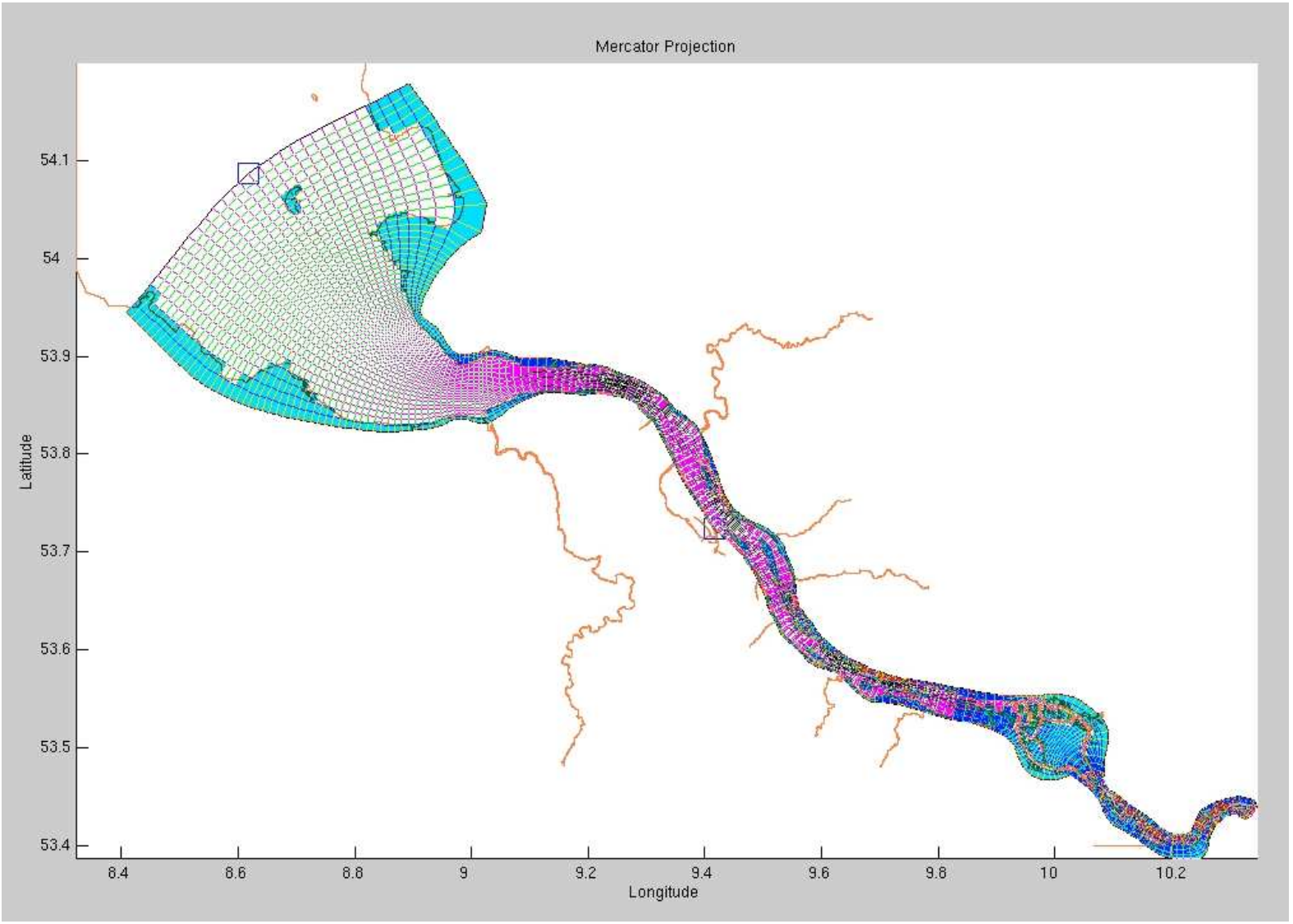
Burchard and Bolding [2002]

East Frisian Wadden Sea



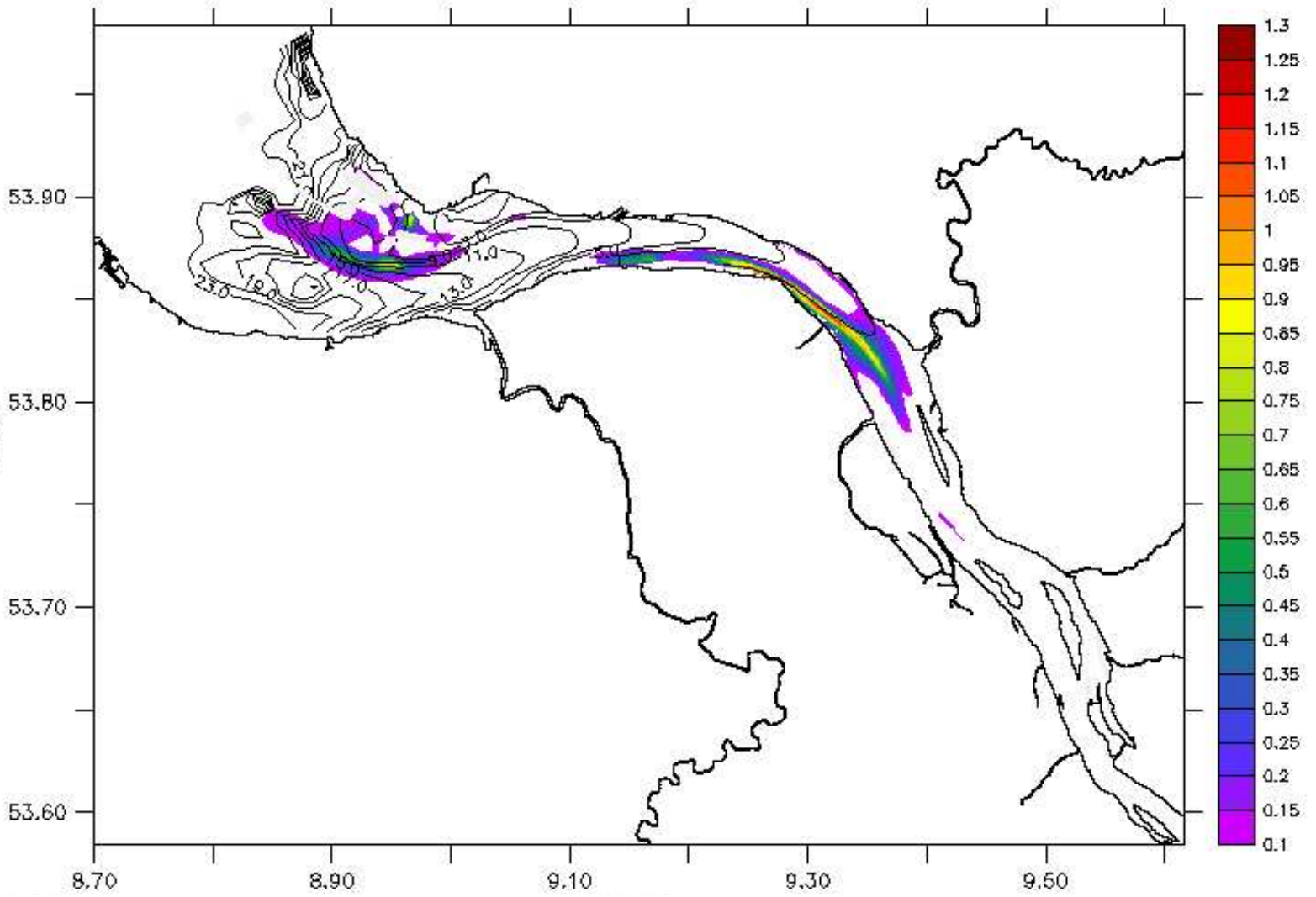
Stanev et al. [2003]

Tidal Elbe I



Topography data provided by BAW Hamburg

Tidal Elbe II



Suspended particulate matter concentration Burchard et al. [2003]

Conclusions, literature

- GETM is one of the very few Public Domain models designed for small scale coastal and estuarine applications.
- The study of coastal and estuarine dynamics is a challenge for Physical Oceanographers.
- An OGCM with high resolution does not converge to a coastal or estuarine model.

1. Burchard, H. and K. Bolding, GETM, a general estuarine transport model. Scientifi c Documentation, European Commission, Report EUR 20253, 157 pp., 2002.
2. Burchard, H., K. Bolding, and M.R. Villarreal, Three-dimensional modelling of estuarine turbidity maxima in a tidal estuary, *Ocean Dynamics*, submitted 2003.
3. Stanev, E.V., J.-O. Wolff, H. Burchard, K. Bolding and G. Flöser, On the Circulation in the East Frisian Wadden Sea: Numerical modelling and data analysis, *Ocean Dynamics*, **53**, 27-51, 2003.