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Particle tracking methodology for Lagrangian numerical simulations

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► **To cite this version:**

Marcos Di Iorio, Mireille Bossy, Cyril Mokrani, Antoine Rousseau. Particle tracking methodology for Lagrangian numerical simulations. Wave and Tidal - 3rd International Workshop, Nov 2018, Valdivia, Chile. hal-01931714

HAL Id: hal-01931714

<https://inria.hal.science/hal-01931714v1>

Submitted on 24 Nov 2018

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Particle tracking methodology for Lagrangian numerical simulations

Advanced modeling in Marine Energy Research Group

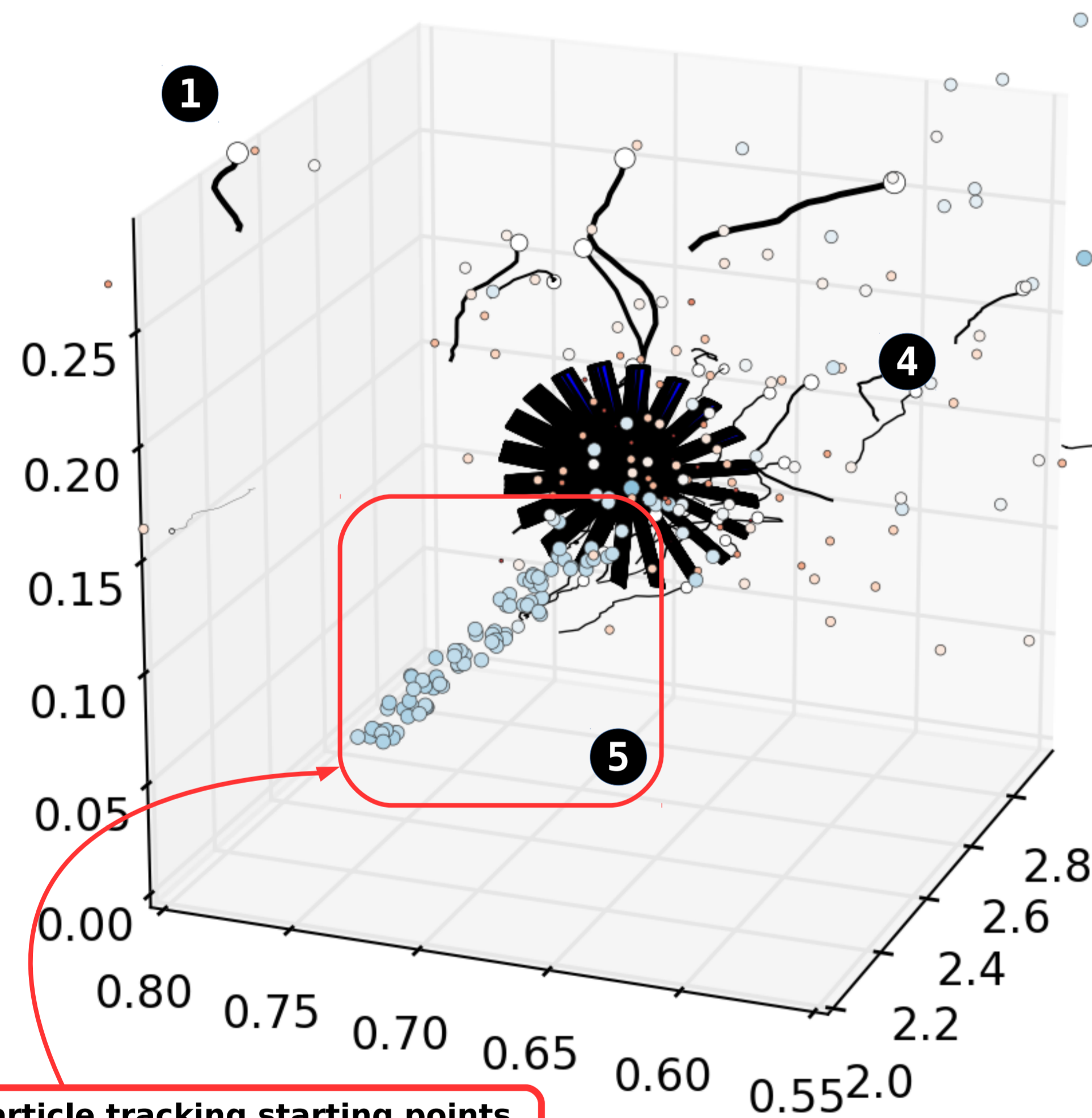
M. Di Iorio, M. Bossy, C. Mokrani & A. Rousseau

Objectives

- **Reproduce the fluid particle trajectories** in order to describe the physical processes involved in the flow.
- Provide a **trajectory visualization tool** useful for SDM-OceaPos developers and users.
- Create a **plug-in version** that can be implemented independently from the existing code.
- **Automate** the methodology **customizable** to different study cases.

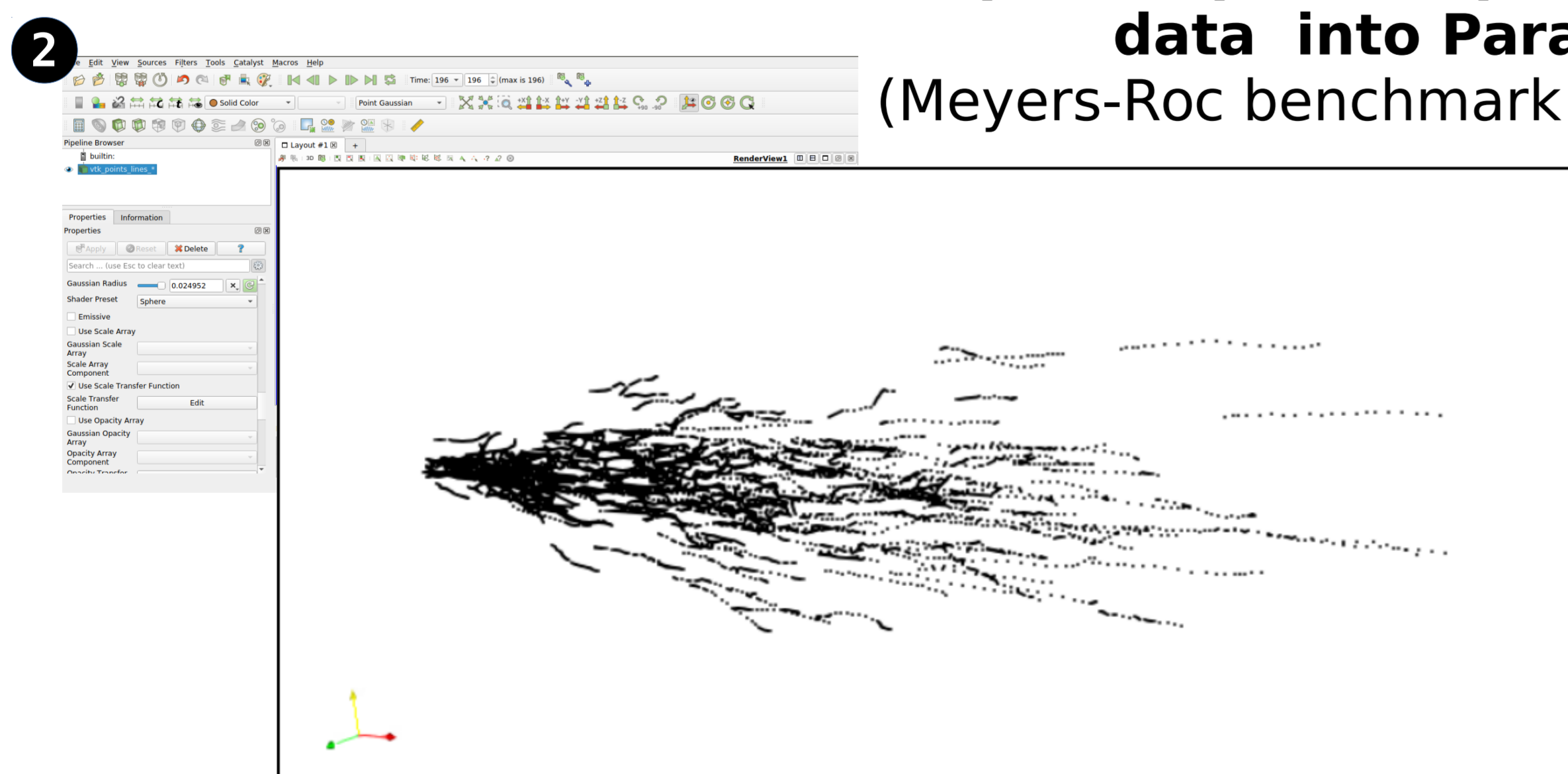
Output Features

3D visualization of a Porous-disk simulation (Meyers-Roc benchmark case)

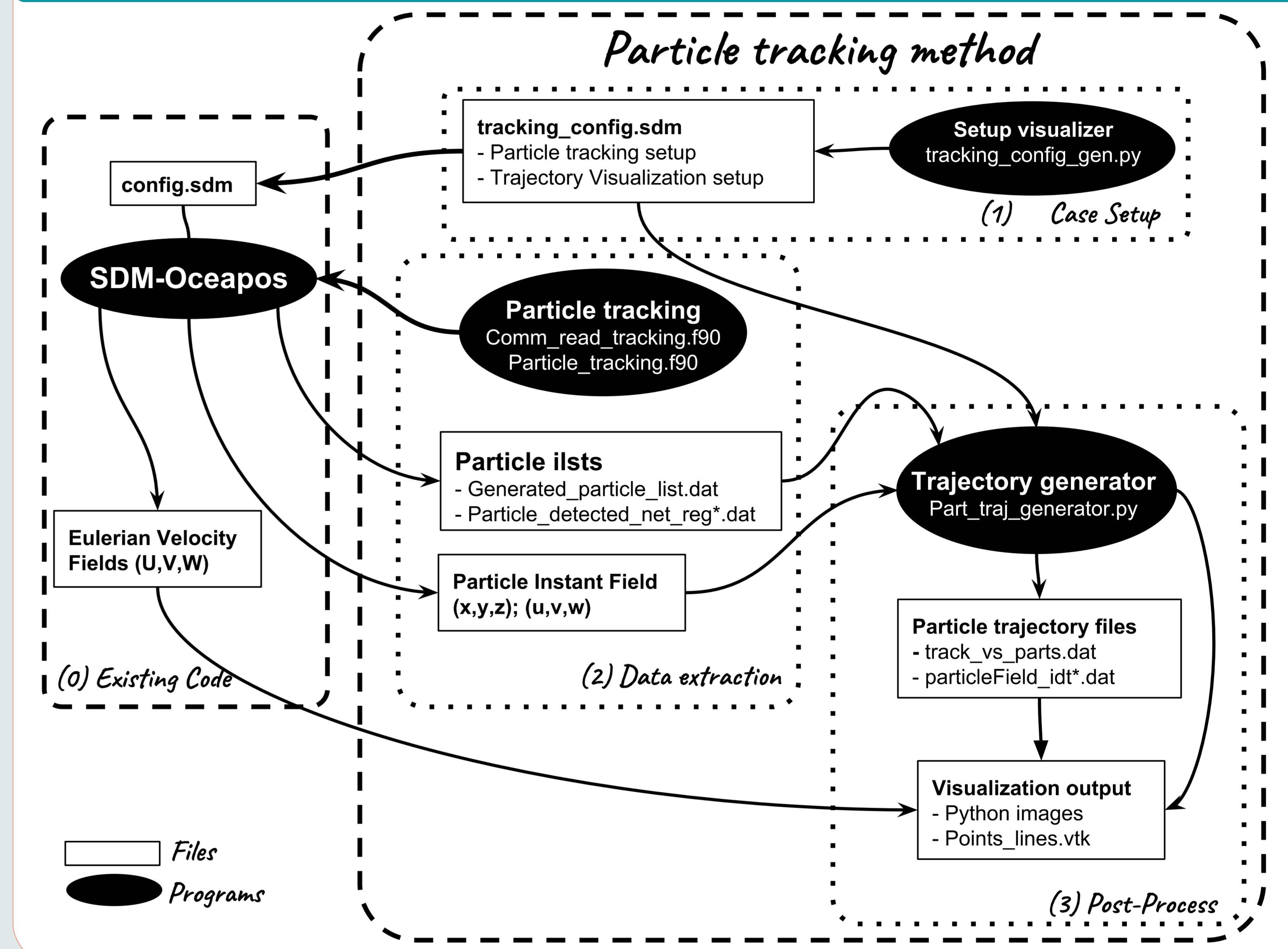


Particle tracking starting points located on the disk's center line.

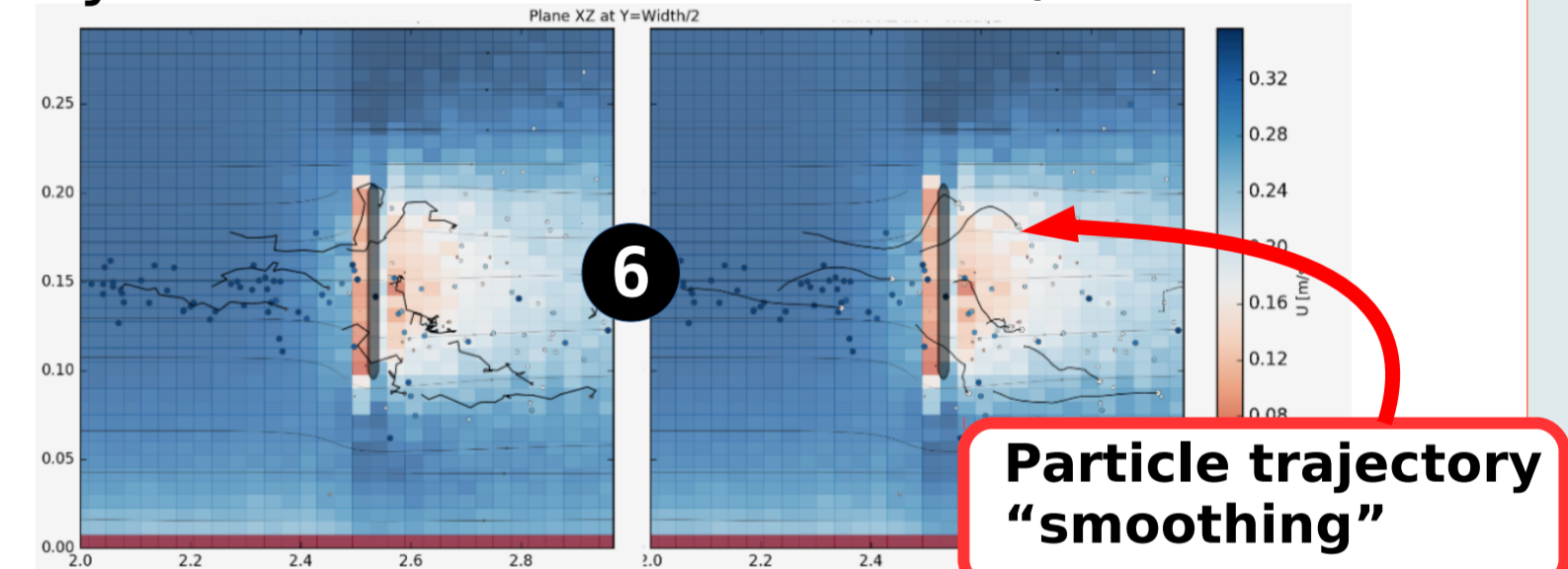
Exported particle position data into Paraview (Meyers-Roc benchmark case)



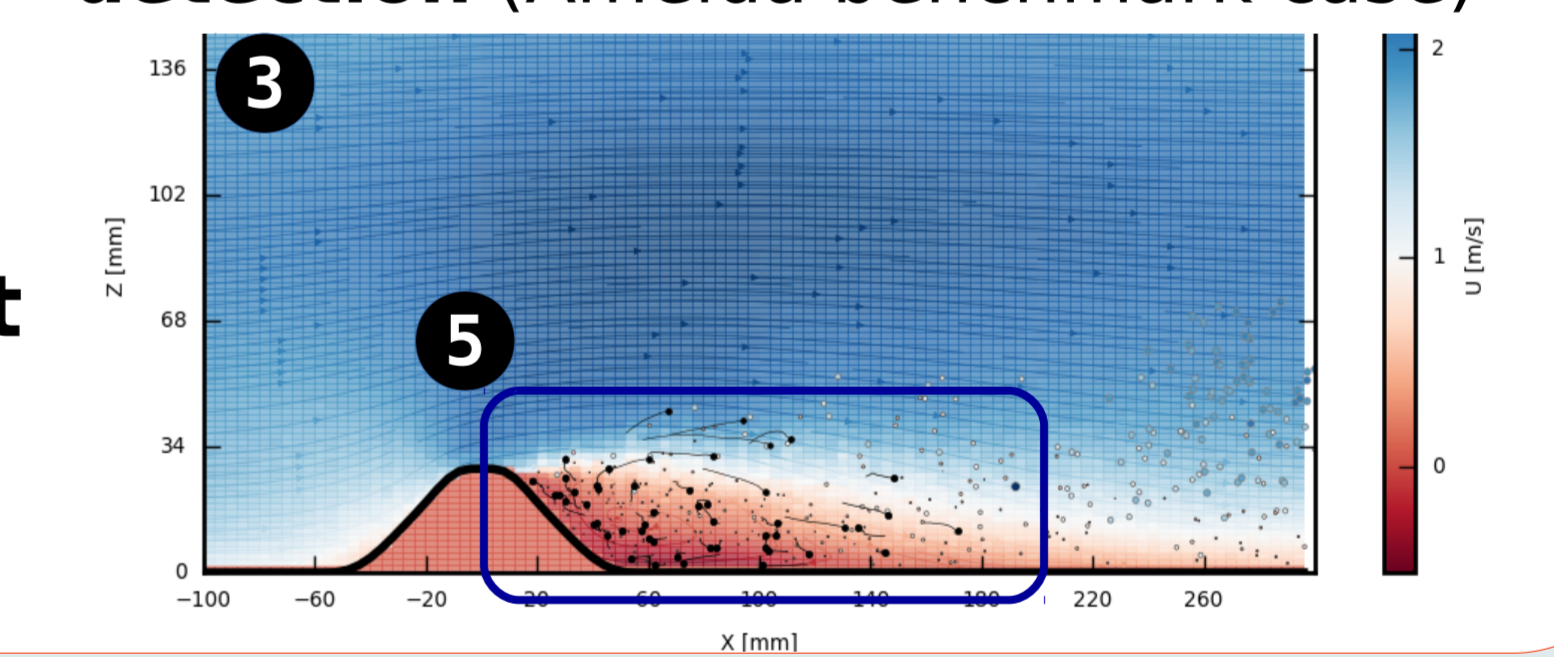
Numerical tool diagram



Particle trajectory treatment (Meyers-Roc benchmark case)



Recirculation region trajectory detection (Ameida benchmark case)



Conclusions

- It was possible to extract and reproduce particle trajectories from the SDM-Oceapos simulation results.
- The tool allows the interpretation of the particle's behavior and helps to understand how it is affected by the Lagrangian algorithm.
- Intuitive parameters, such as trajectory length and particle velocity at the region of interest, can be implemented to customize the image generation.