

# A method to simulate solute transport

Andriy Bun, Timo Heimovaara

March 4, 2013

## Abstract

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## 1 Introduction

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## 2 Model

The described method combines properties of both marker-in-cell technique (Gerya, 2009) and finite cell method (Sun, 1999). Its basic idea is to use Lagrangian advecting points (marker, tracers or particles) and combine it with an immobile Eulerian grid. In this approach properties are initially distributed on a number of Lagrangian points that are advected according to a given/computed velocity field. The advected properties (e.g. concentrations) are then interpolated from displaced Lagrangian points to the eulerian grid (Gerya, 2009).

Describe modifications to marker-in-cell method:

- markers with volume / mass;
- interpolation of velocity field;
- subgrid diffusion term calculation to keep mass balance correct;

## 3 Validation

In order to validate the described method, it was tested against a number of analytical solutions. Convection-diffusion equation (CDE) is a commonly accepted model for solute transport. Without sources/sinks this equation has a form:

## References