Fundamentals Of Natural Gas And Species Flows From Hydrate Dissociation - Applications To Safety And Sea Floor Stability

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OUTLINE

- Objective
- Statement of Work
- Preliminary Results

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Objectives

- Natural Gas-Water-Solid Mixture Flows in the Reservoir During Hydrate Dissociation
- Computational Models for Two- and Three-phase Flows
- Assess the Potential for Sea Floor Instability

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TASKS

Task 1. Laboratory Experiments

- **Subtask 1.1 - Transparent Hydrate Chamber**
  - **Optical Measurements of Phasic Velocities**
  - **Dissociation in Consolidated and Unconsolidated Sediments**

- **Subtask 1.2 - Shear Flow Apparatus**
  - **Optical Velocity Measurements**

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Task 2. Model Development

- **Subtask 2.1 - Thermodynamic Model**
  - Three Phase Flows

- **Subtask 2.2 - Material Characterization**
  - Material Parameters of Multiphase Mixtures

- **Subtask 2.3 - User's Manual**

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Task 3. Safety and Seafloor Stability

- **Subtask 3.1 - Pressure Buildup**
  - **Drilling with or without Chilling Fluid**

- **Subtask 3.2 - Analysis of Seafloor Stability**
  - **loss of strength and liquefaction**

- **Subtask 2.3 - User's Manual**

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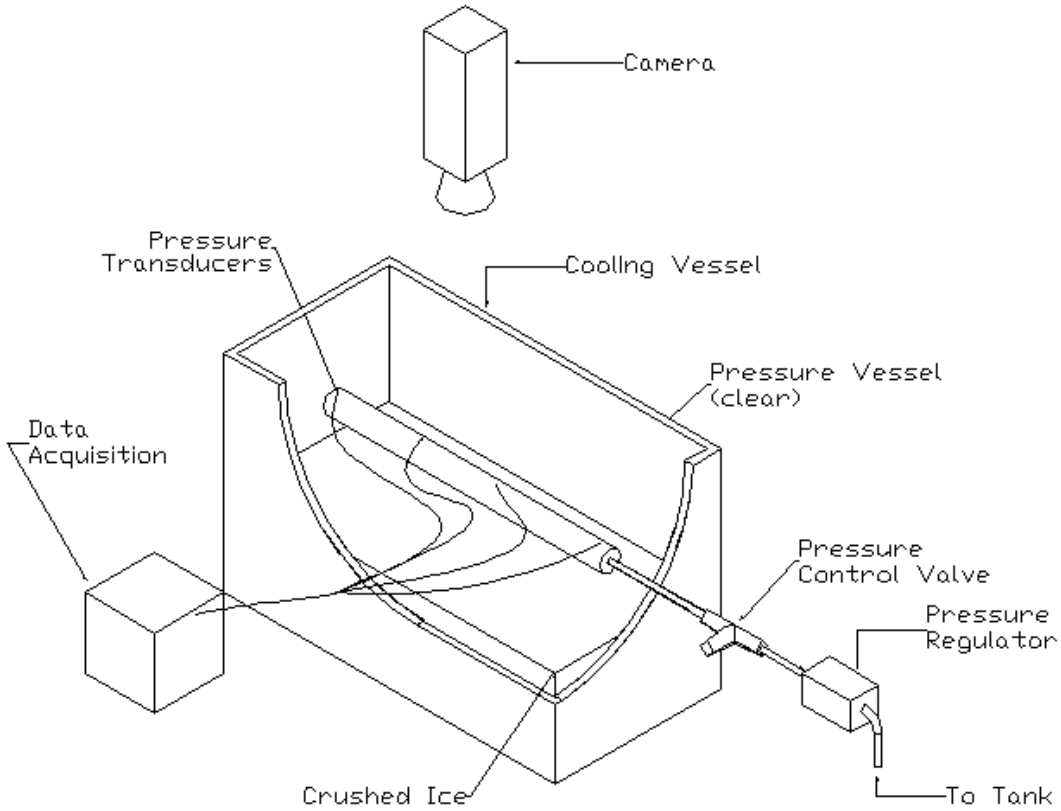

Schematics of the experimental setup.

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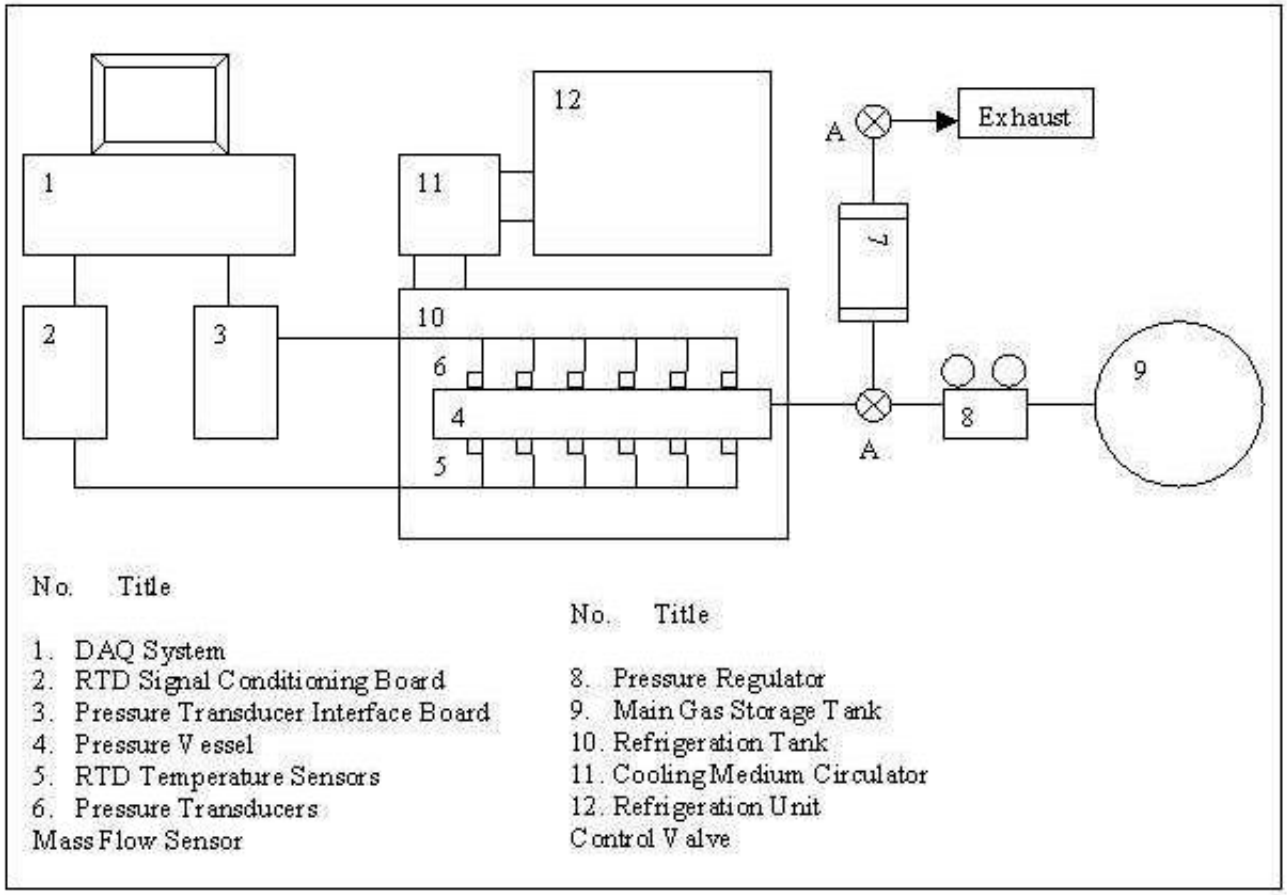

Schematics of the measurement system.

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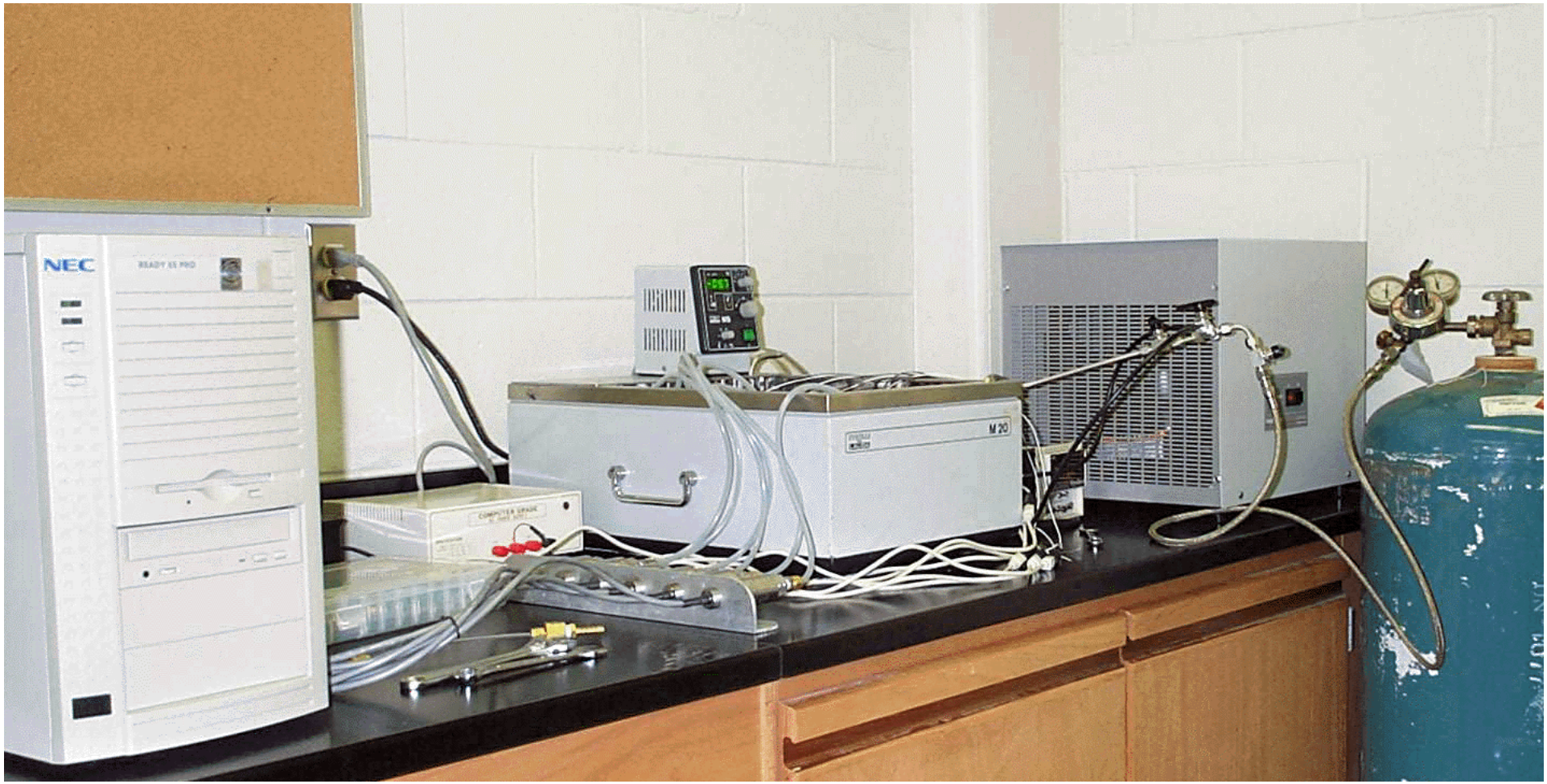

Experimental setup.

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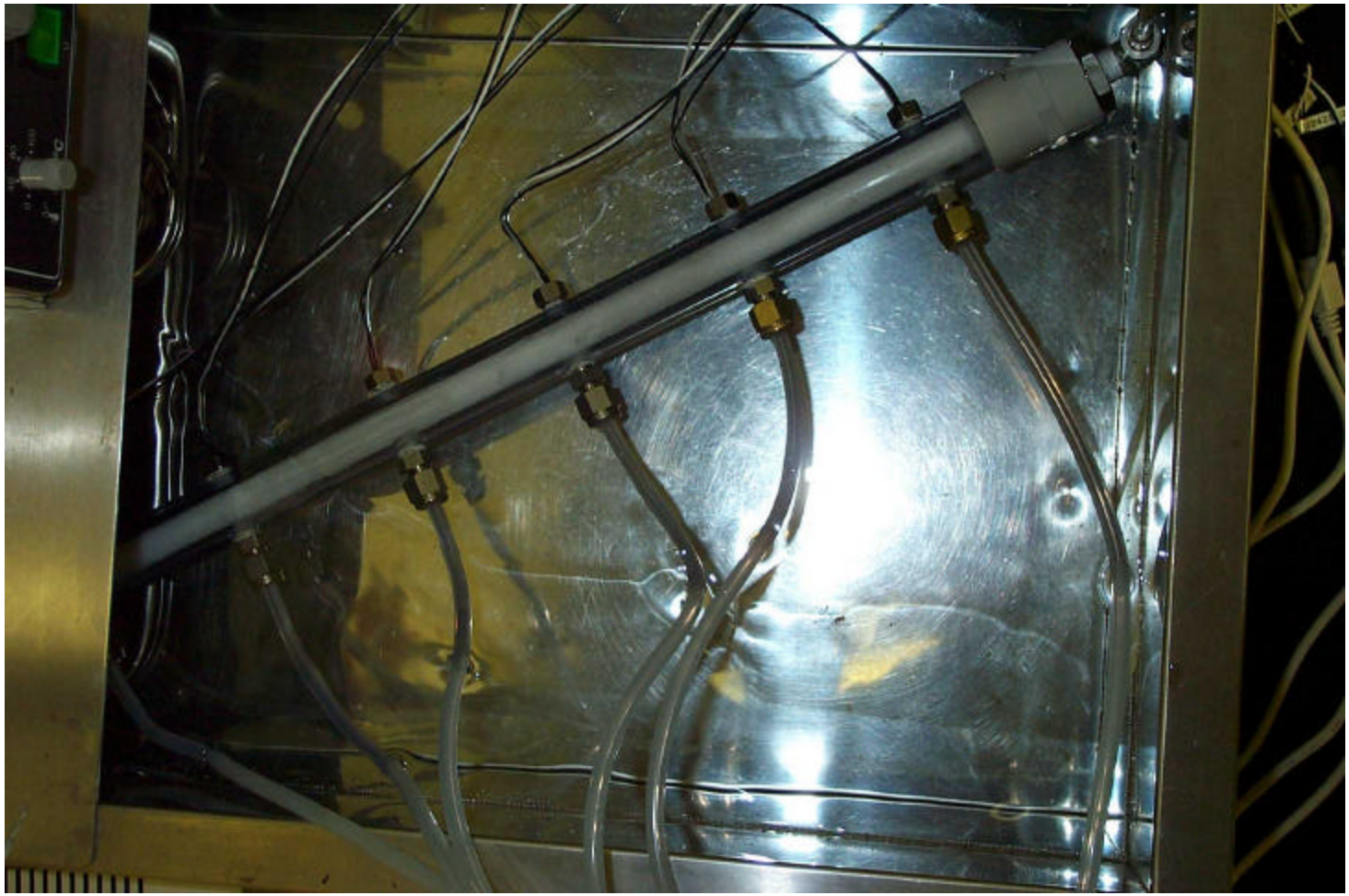

Transparent hydrate chamber.

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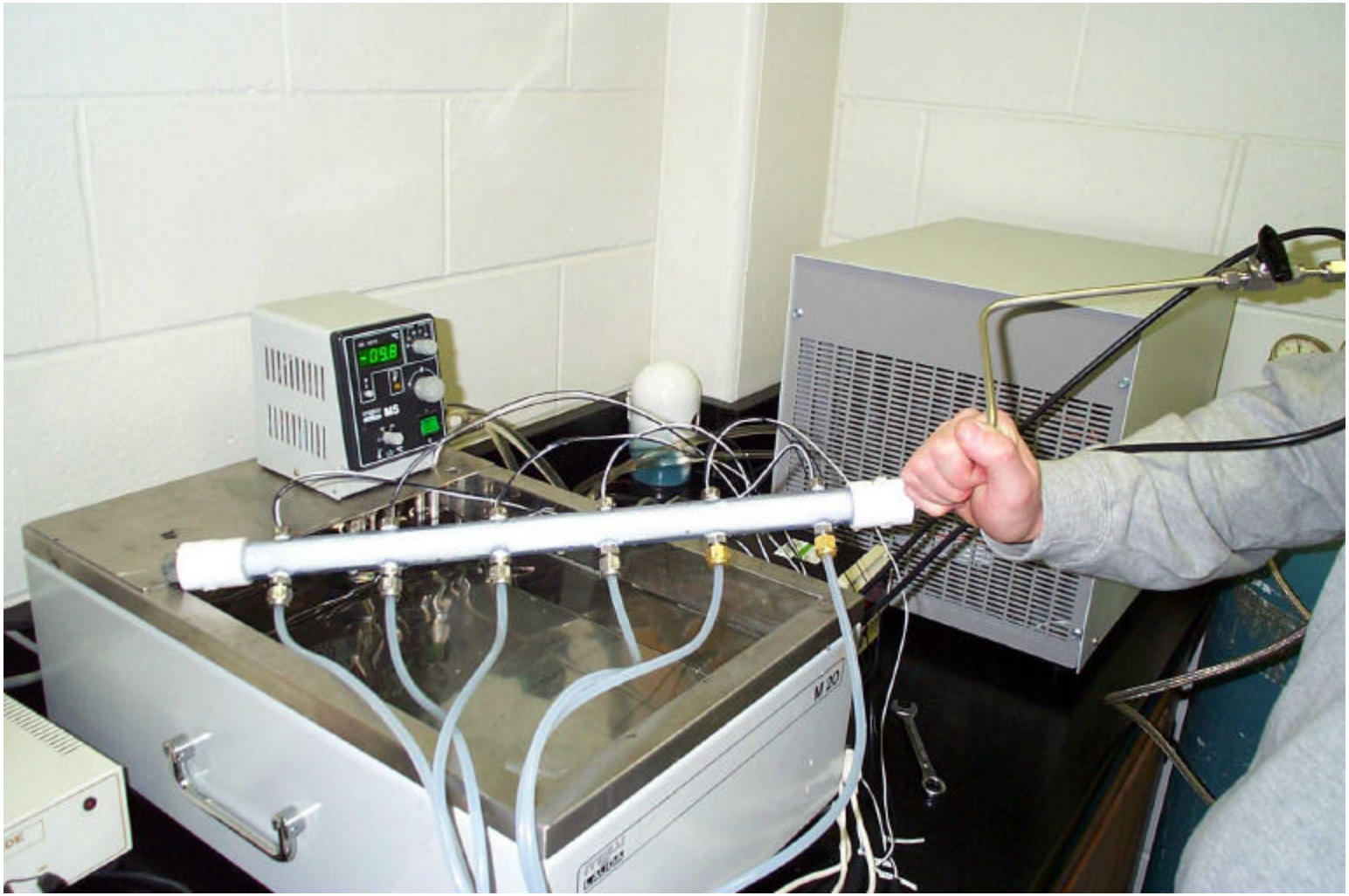

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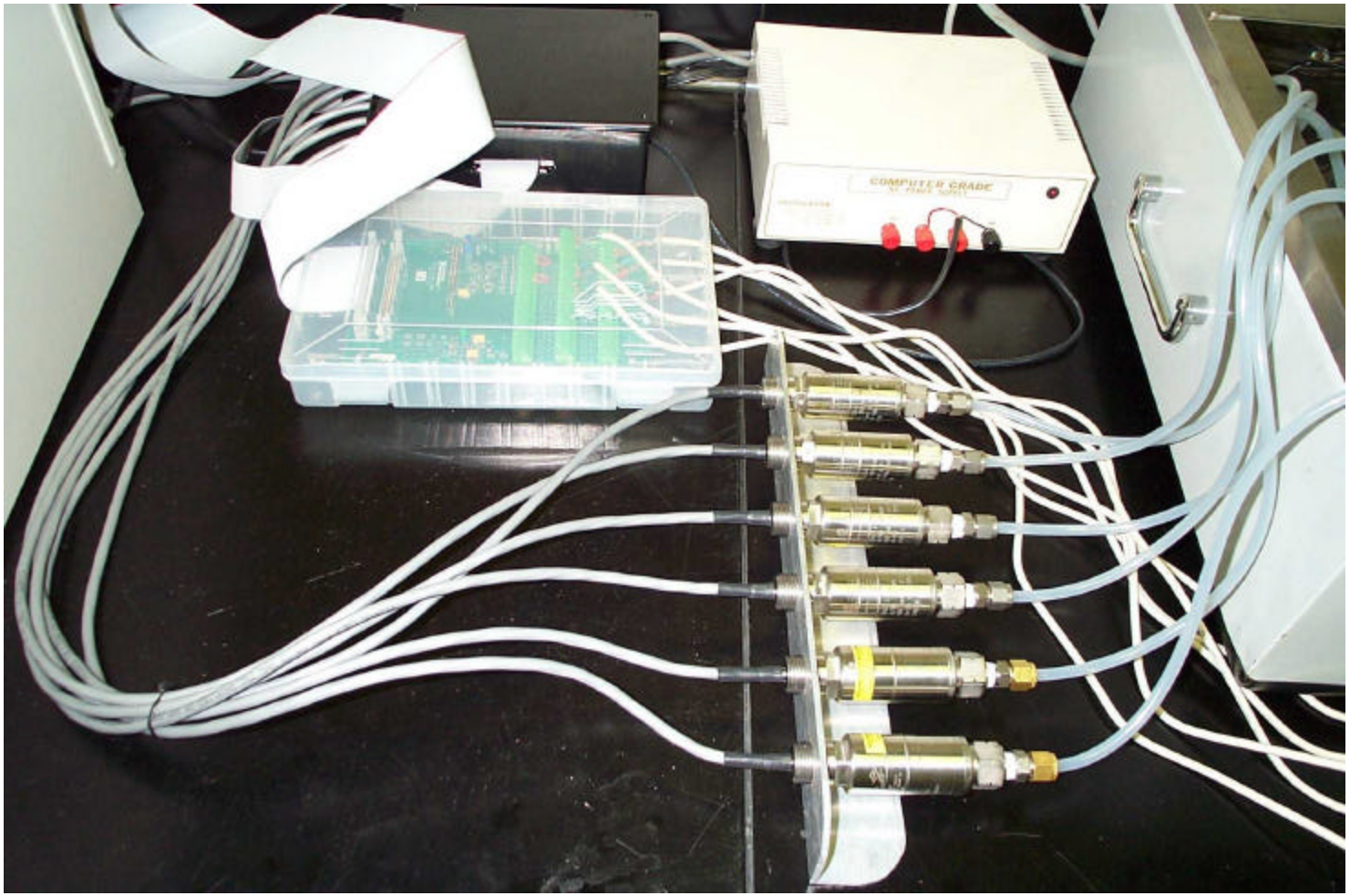

Pressure sensors.

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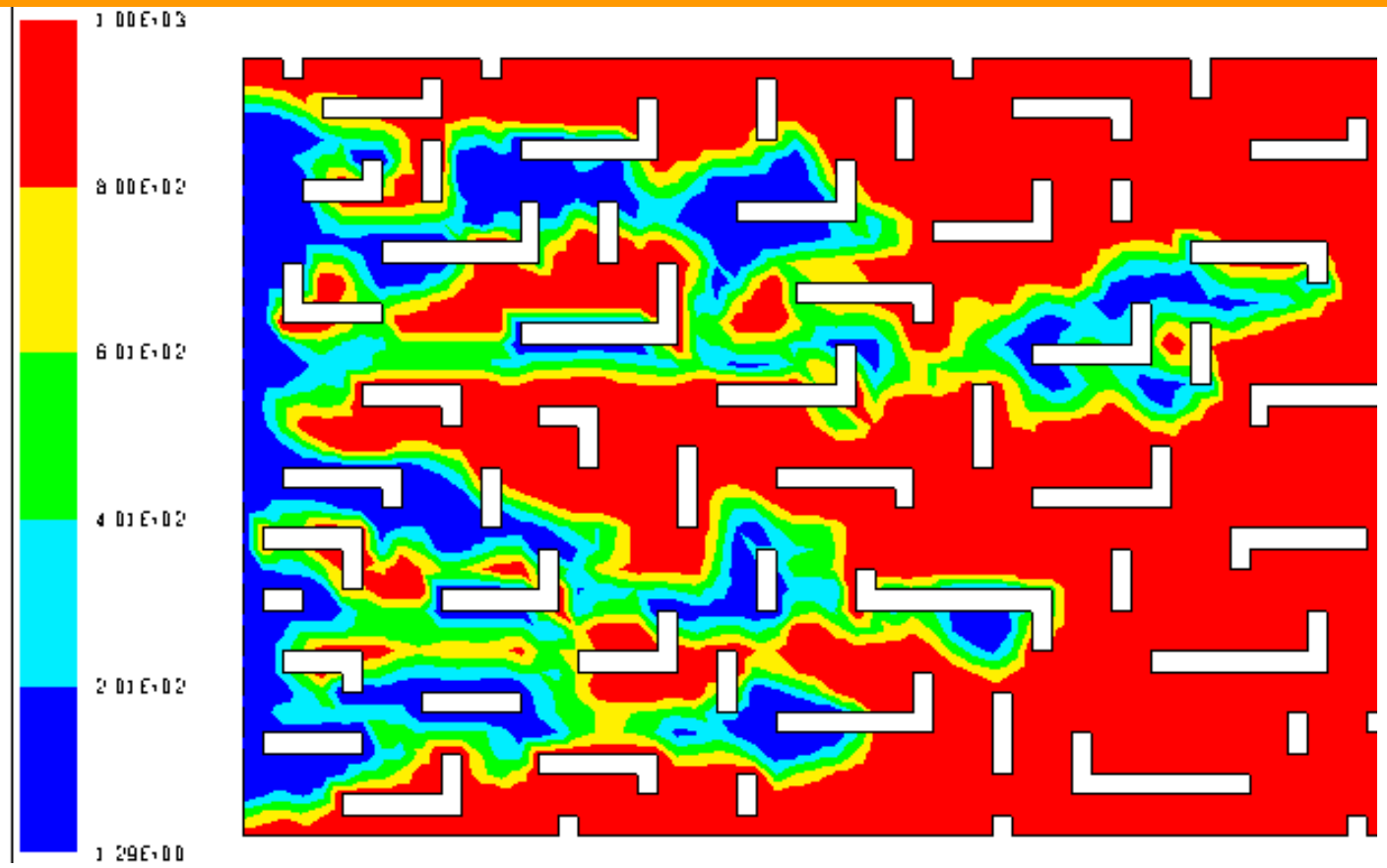

Density variations in the reservoir during gas flow.

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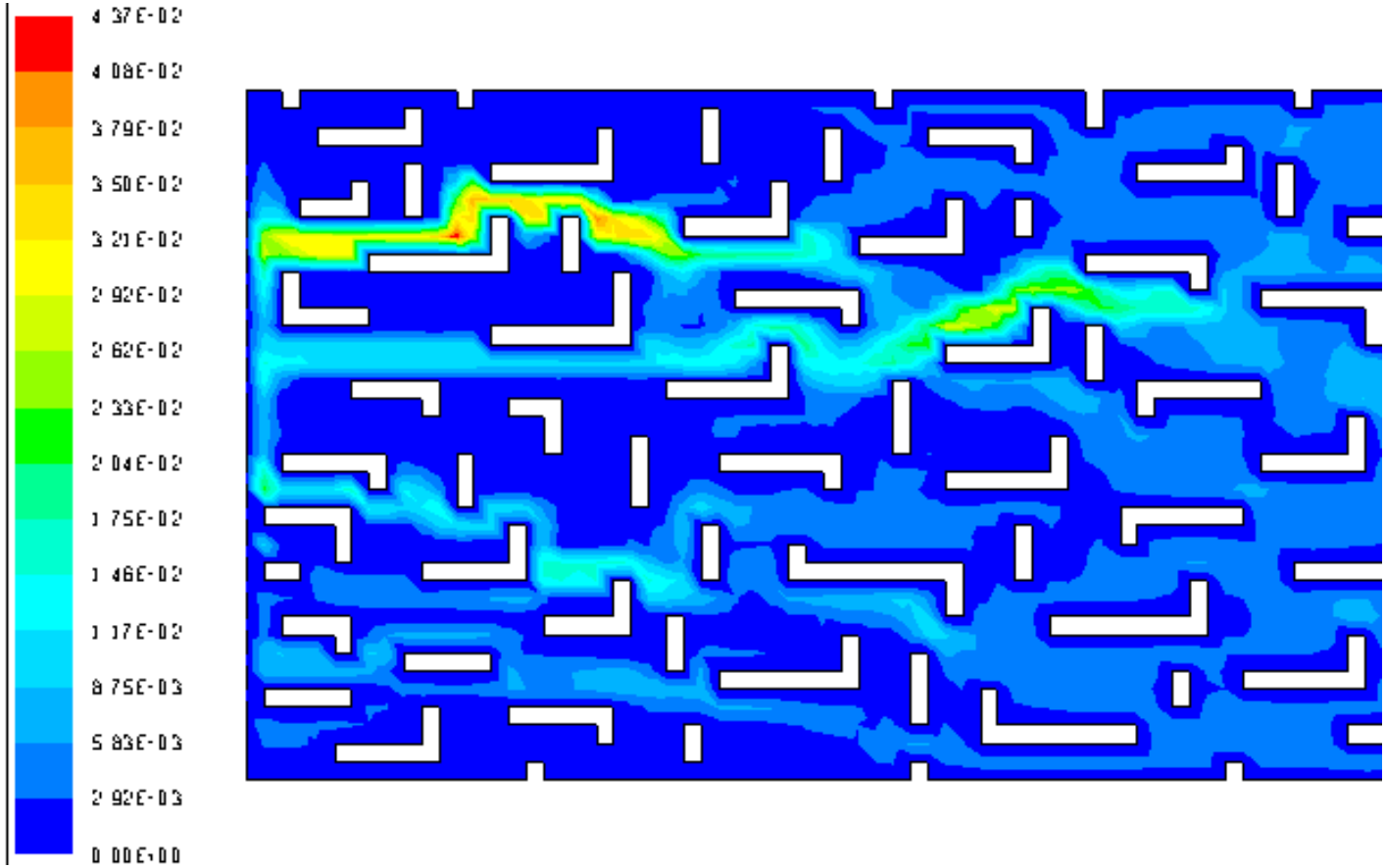

Velocity magnitude variations in the reservoir during gas flow.

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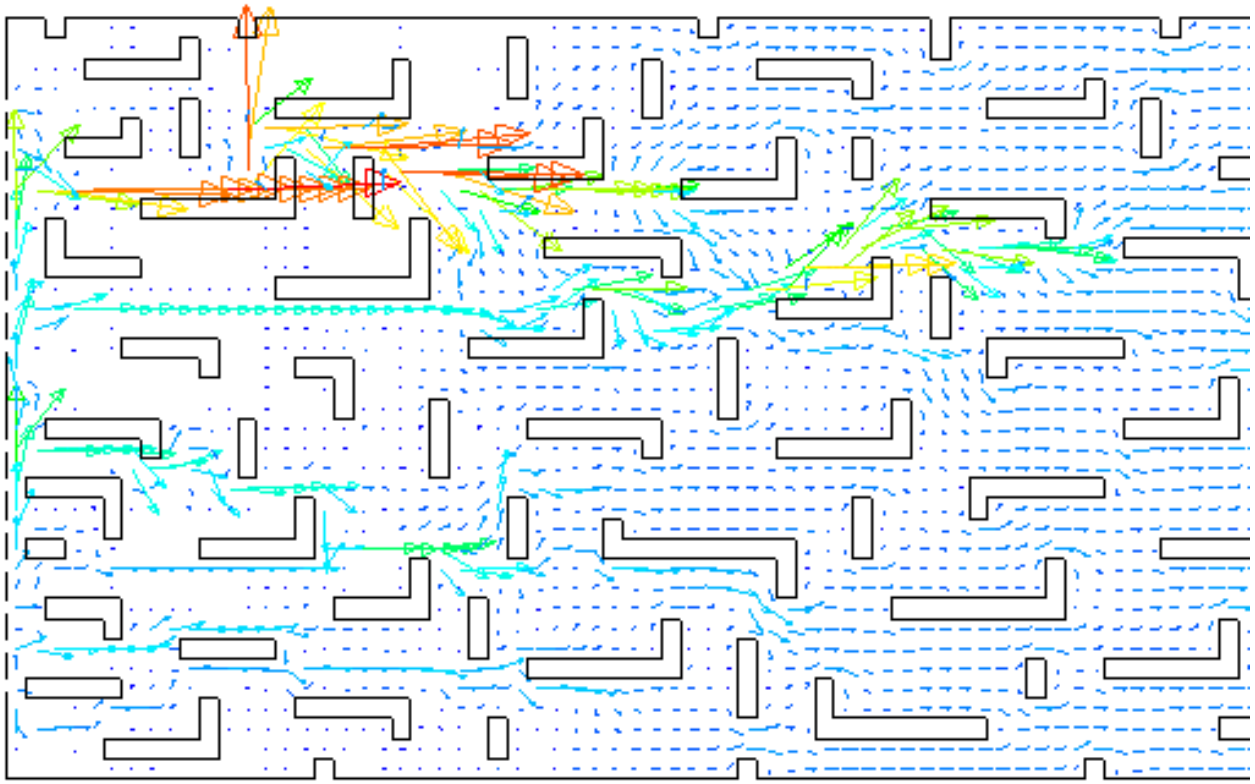

Velocity vector field in the reservoir during gas flow.