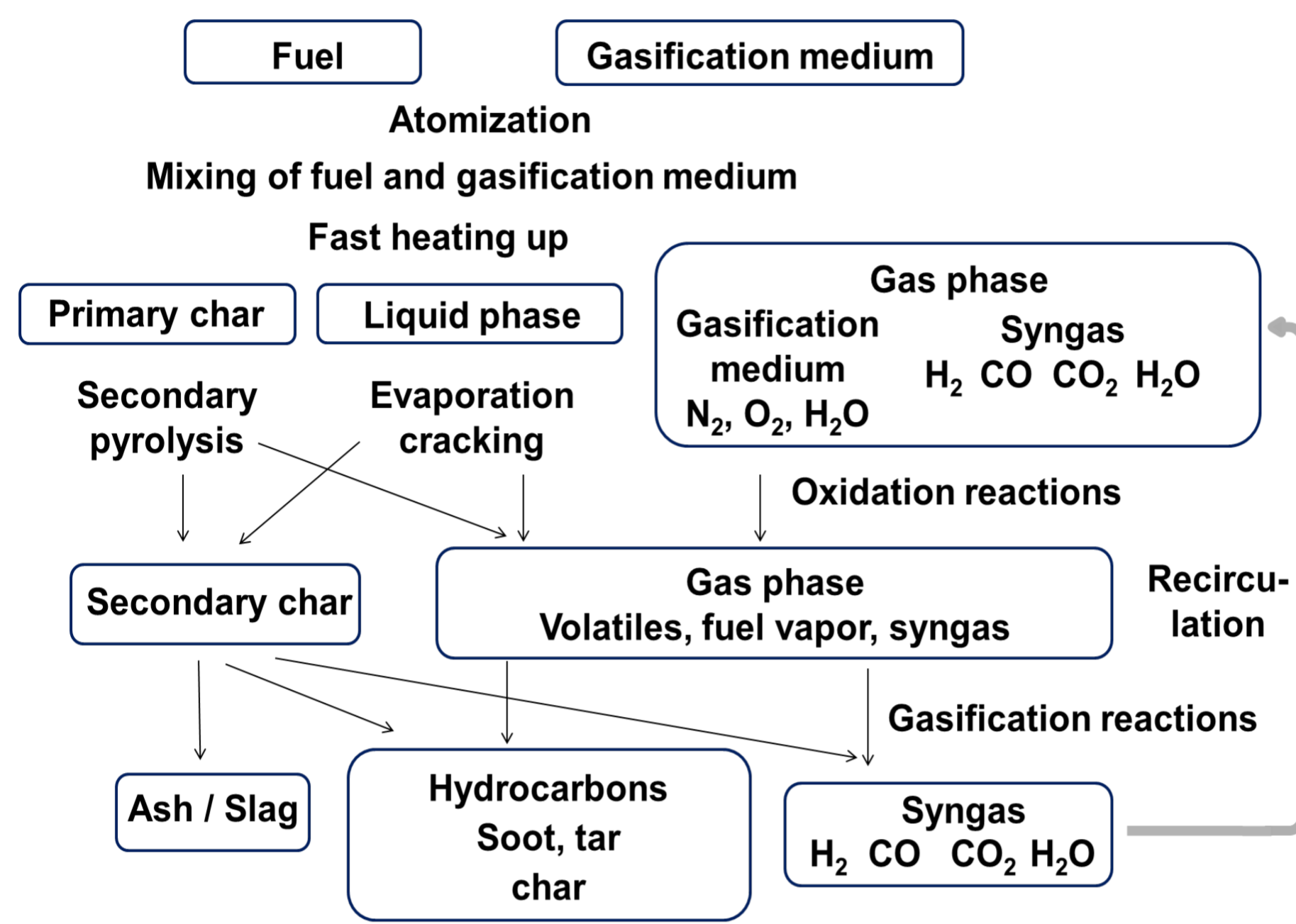


Atmospheric Gasification of Suspension Fuels

Sabine Fleck, Christian Hotz, Thomas Kolb

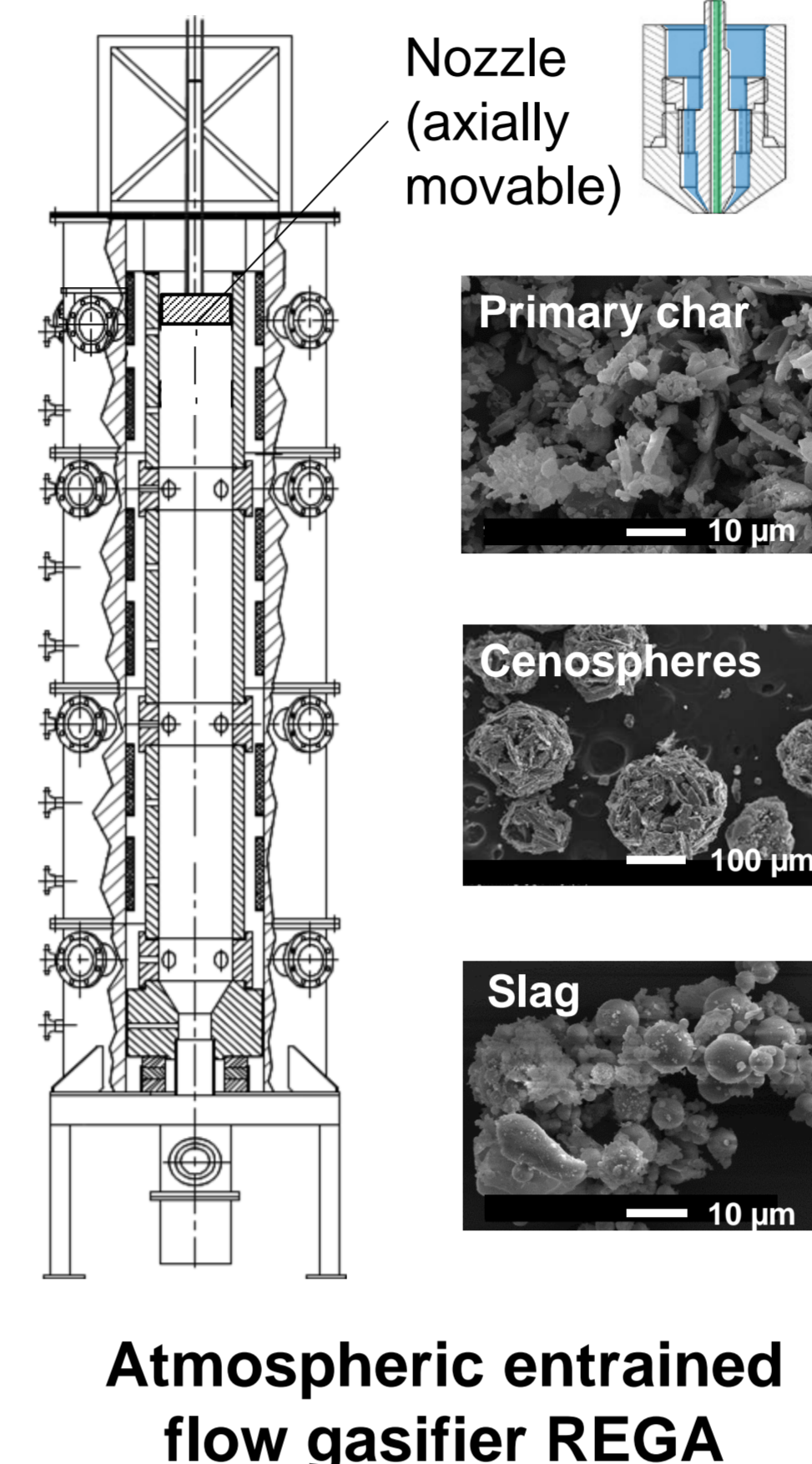
Challenge + Objectives

Entrained Flow Gasification of Suspension Fuel multi-phase reacting system at high temperature



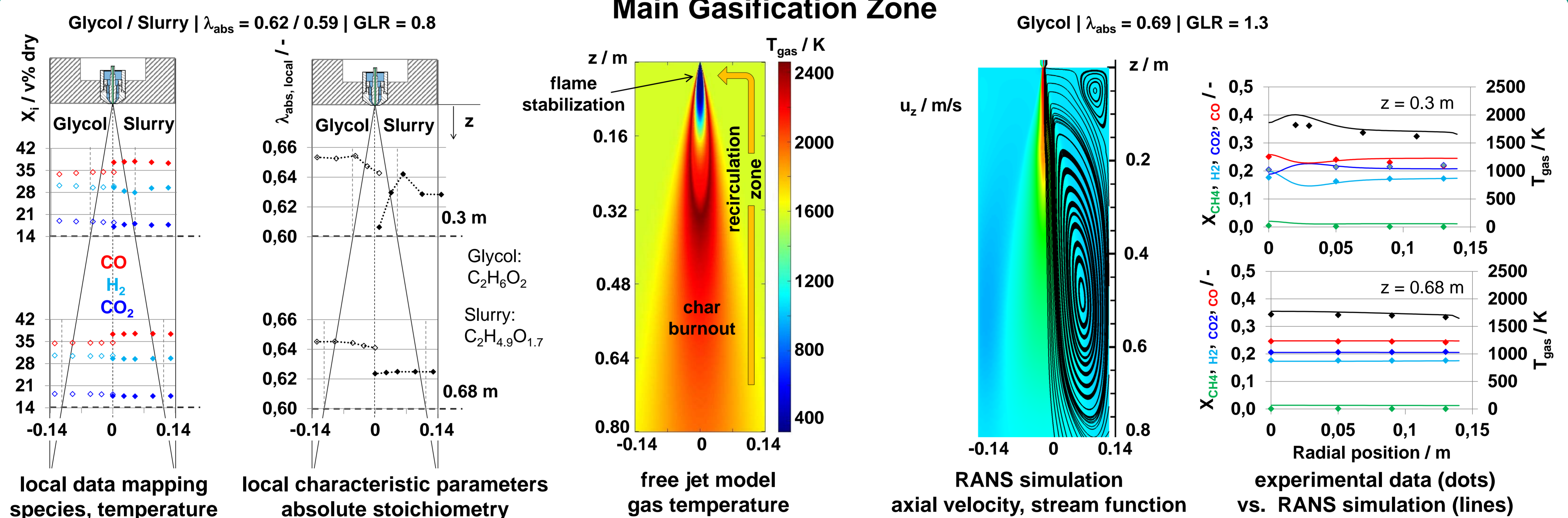
- Understand and describe sub-processes
- Develop models for numerical simulation tool
- Validate simulation tool by detailed experimental data

Approach



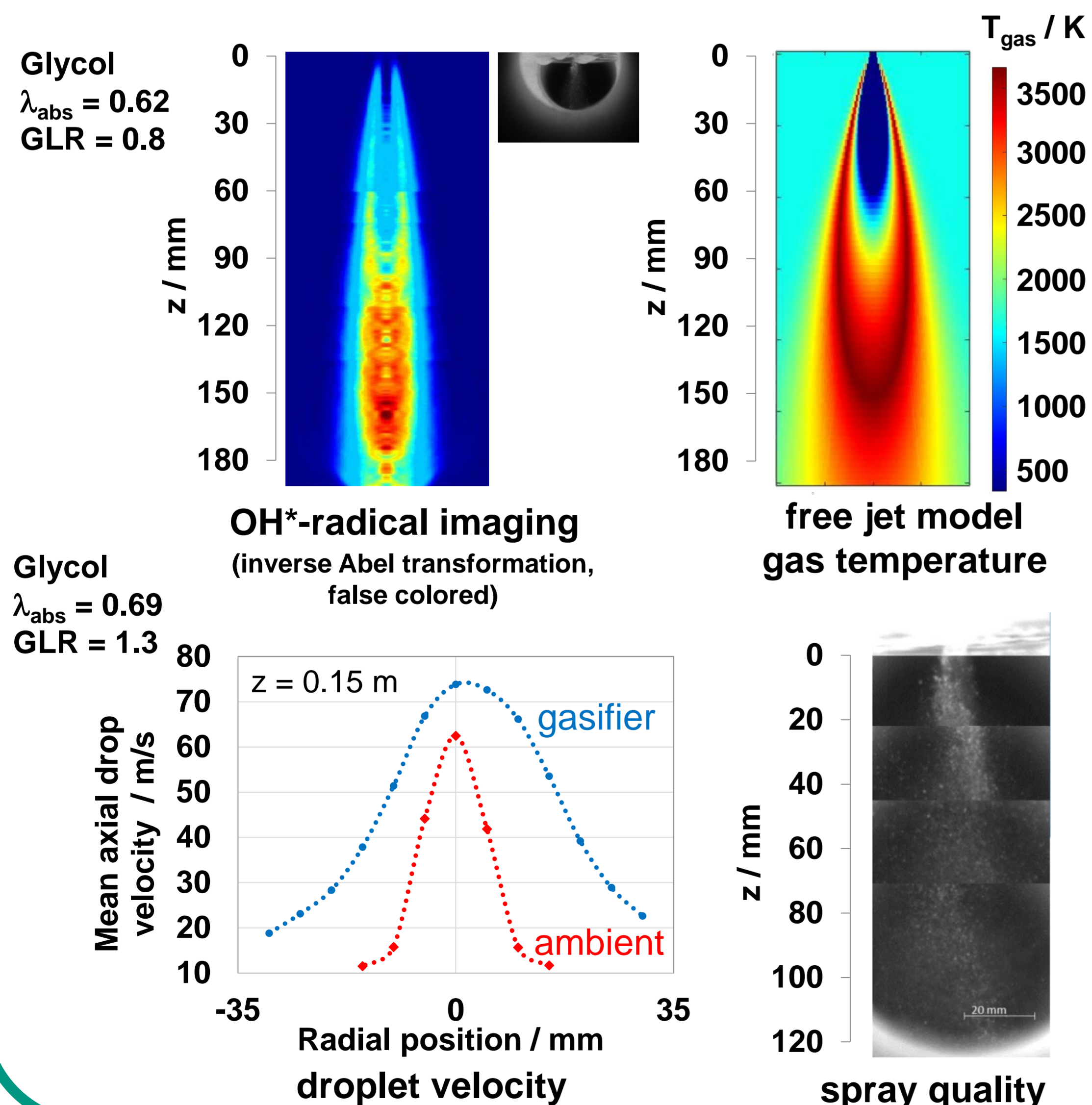
- Atmospheric experiment for detailed process data
- Mapping of gasifier: local profiles of X_i , T , u
- Independent variation of operating parameters
- Free jet model for evaluation and sensitivity analysis of sub-process models
- Numerical simulation, RANS, for overall process
- Basis for pressure simulation (bioliq® EFG)

From Detailed Experiment to Validated Simulation



S. Fleck et al.; Fuel 217 (2018) 306-319

Near Flame Zone



Results

- Local data describe mixing and reaction pattern
- Local characteristic parameters assess consistency of measured data and quantify reaction conditions
- Burner momentum determines spray quality and entrainment from outer recirculation zone → flame position / structure / stability
- RANS simulation is validated for glycol
- Free jet model matches OH* profile qualitatively

Future work

- Application of wider fuel specification
- Determination of catalytic effects of ash components
- Application of free jet model for sub model validation

Cooperation