Advancing Near-Wellbore CO_2 Injection Modelling with OLGA: Integrated Simulation from Reservoir to Wellhead

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Benefits of modelling near-wellbore dynamically

- Increased insight in Joule-Thomson cooling effect
- Thermal coupling of the reservoir and the entire well interface
- Better control of short-term injection transients
- Improved understanding of backflow during shut down
- Accurate modelling of temperature and pressure gradients
- Remediation of salt precipitation

Olga-INTERSECT coupling

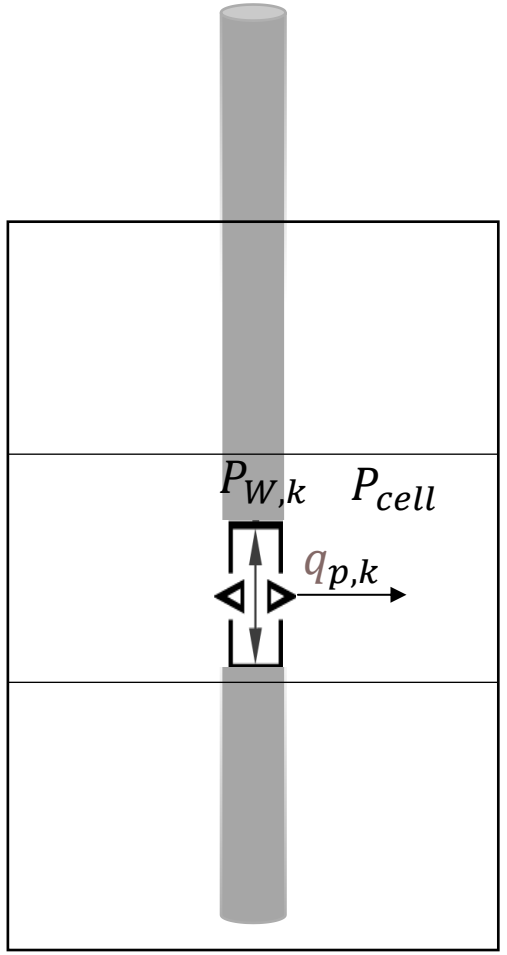
From Olga

Transfer of mass and energy into reservoir conservation equations

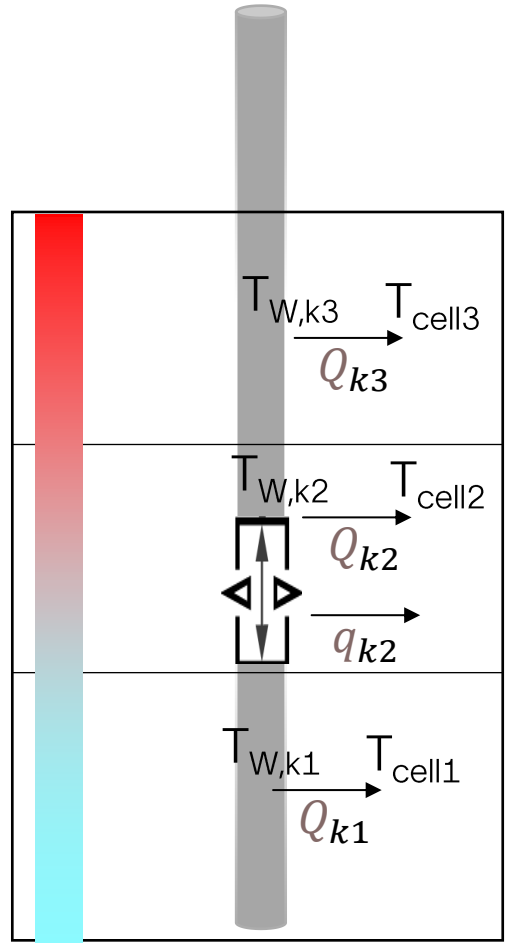
From reservoir

Transfer of mass and energy into Olga conservation equations

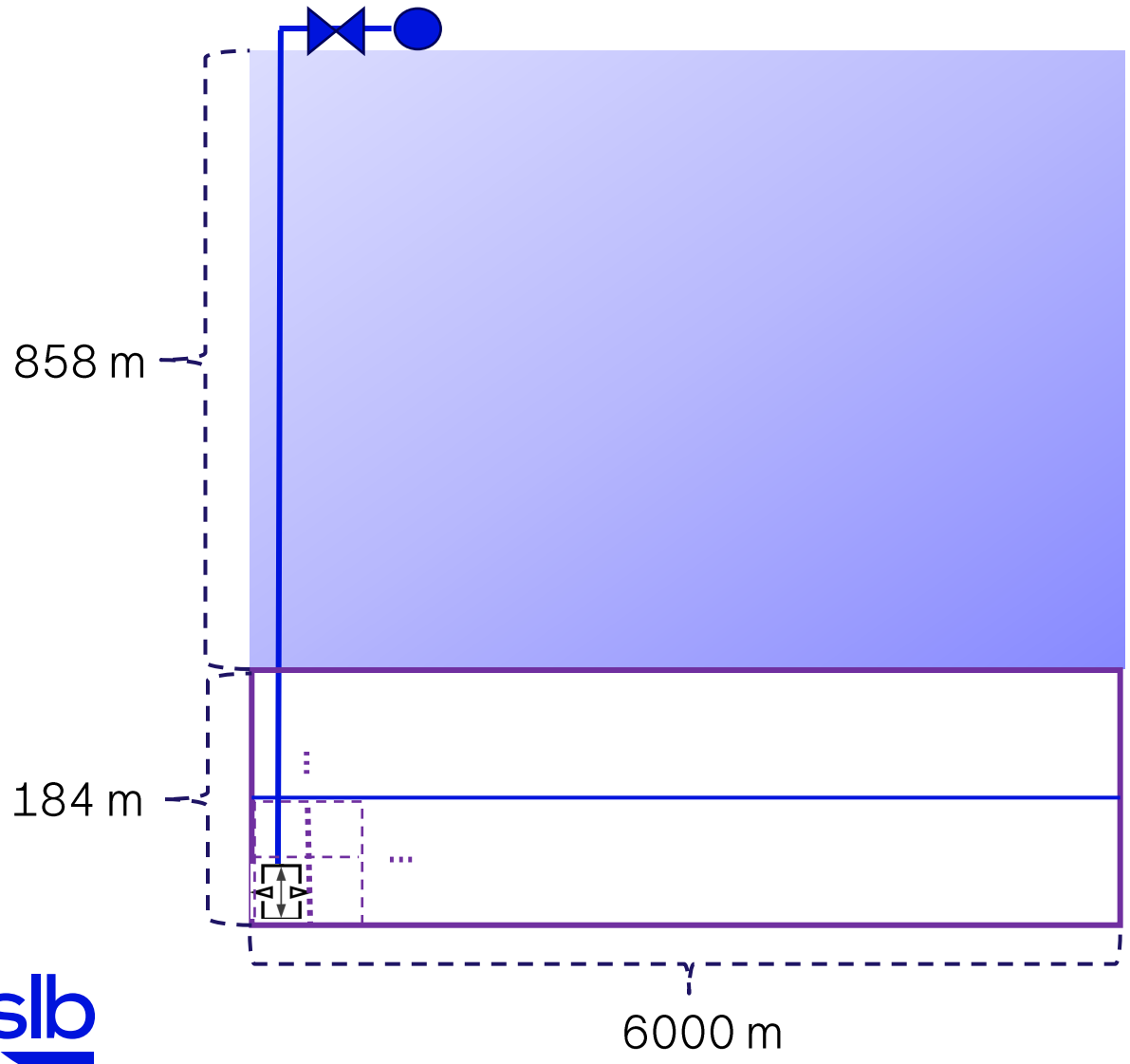
Flow coupling



Thermal coupling



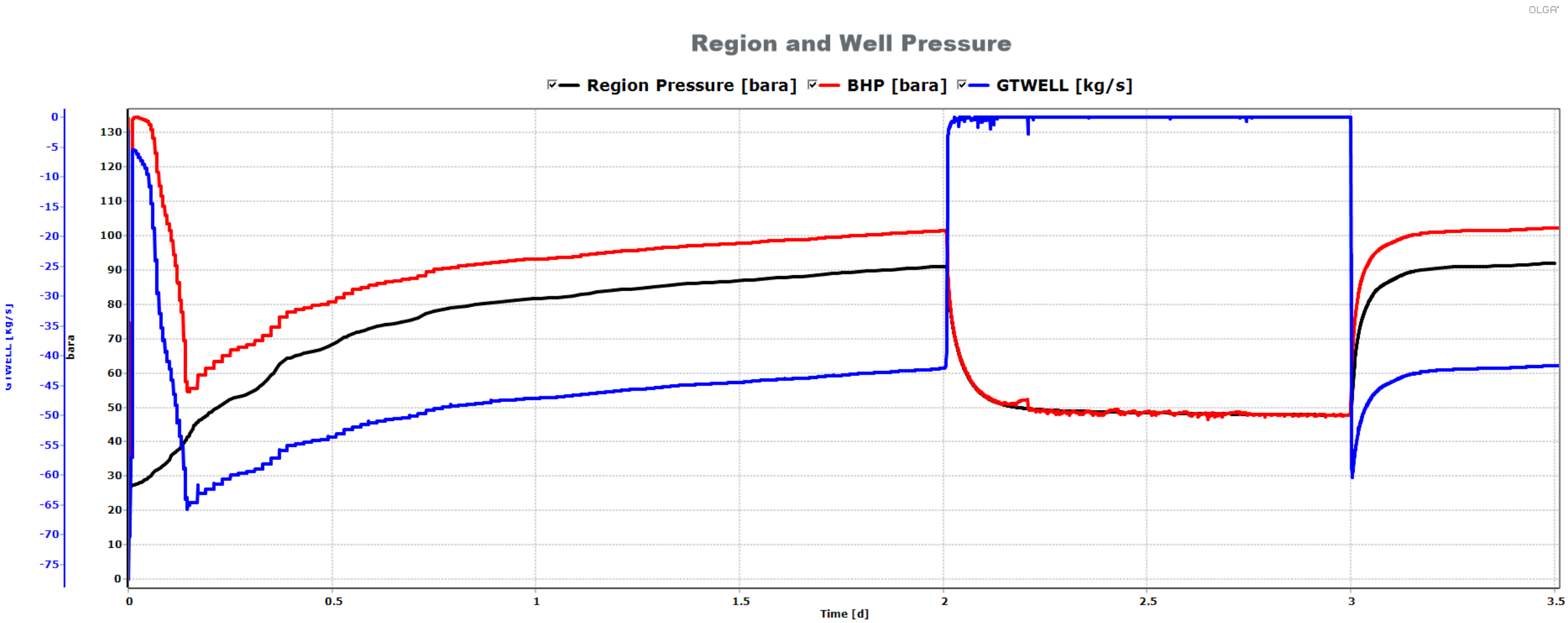
Example Case



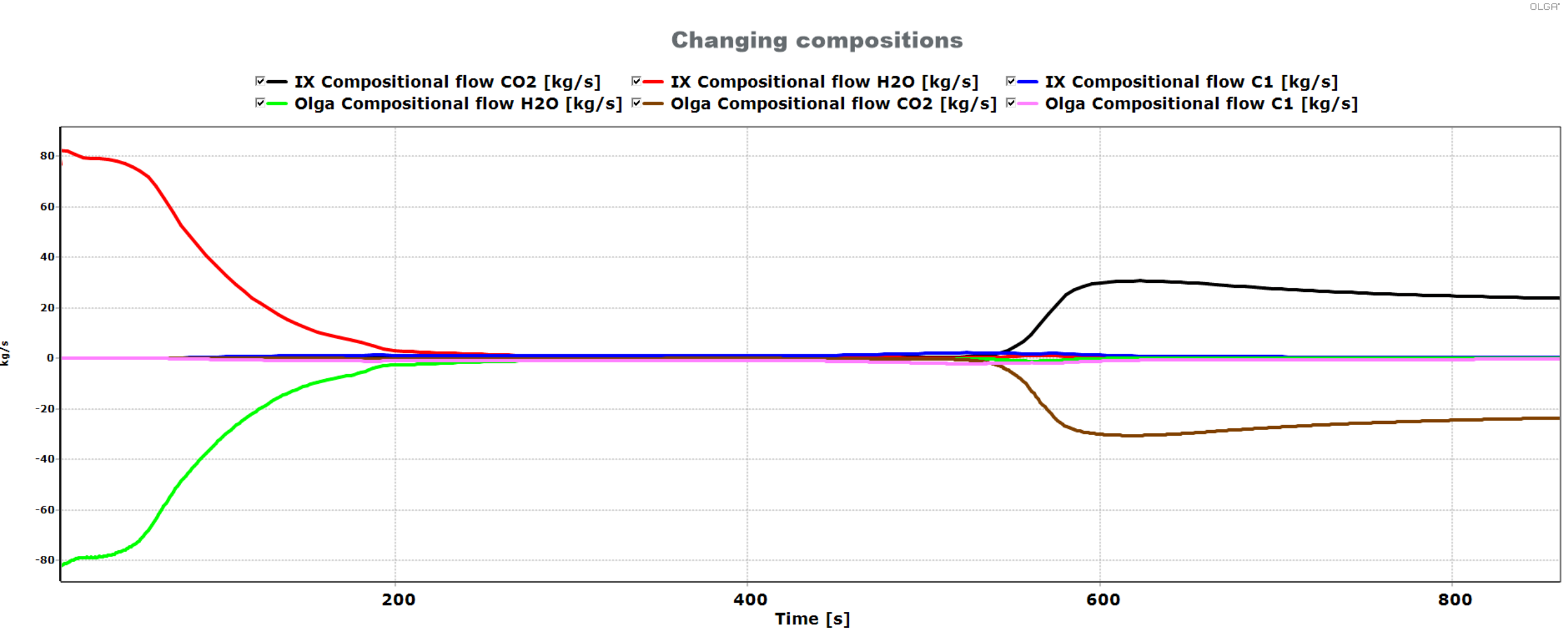
- Vertical well into depleted gas-reservoir
- Total simulation time is 3.5 days (from January 1st)
  - 2 days of injection
  - 1 days of shut-in
  - 0.5 days of injection

- All we do is adjust the topside choke in Olga

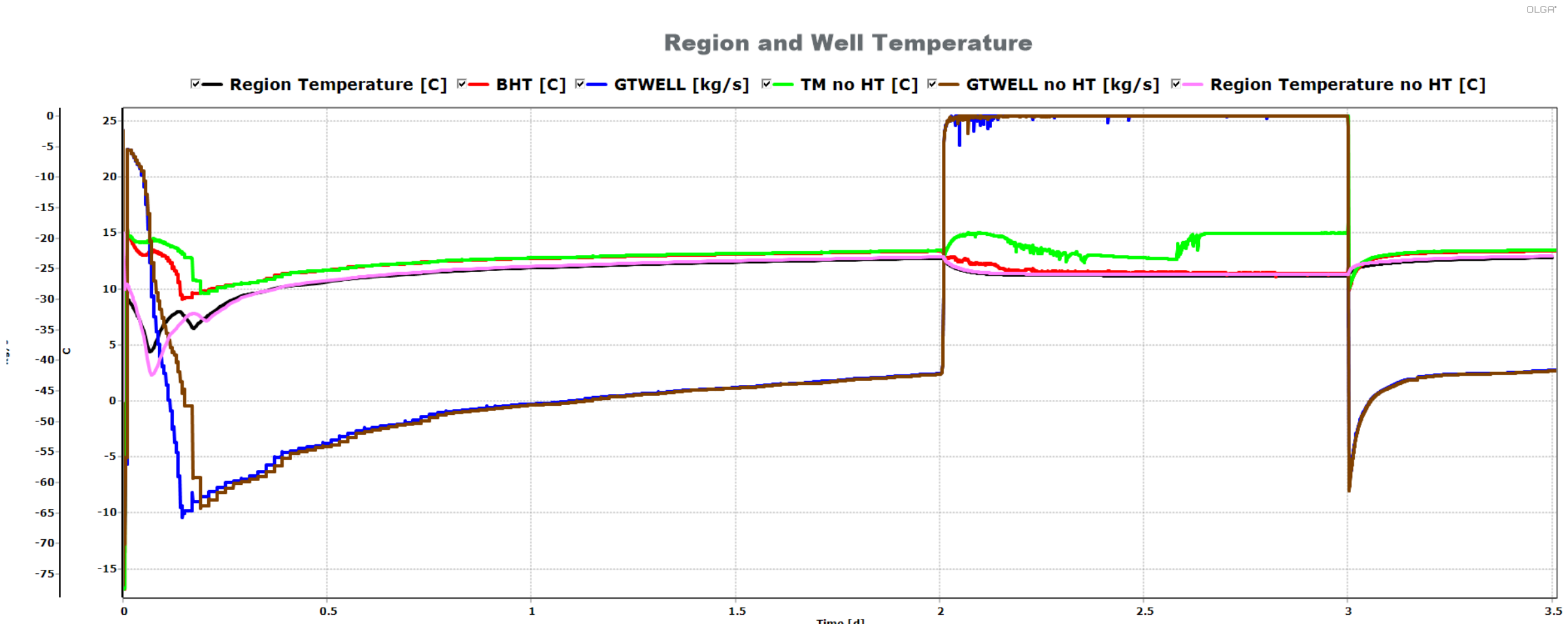
Effect of Mass Flowing Into Reservoir



Compositional flow



Effect of Energy Flowing Into Reservoir



Olga CO_2 TIDE

(Transport and Integrated Domain Extension)

台灣中油股份有限公司
CPC Corporation, Taiwan
TotalEnergies
REPSOL
PTTEP
GASSNOVA
Woodside

slb

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