

Improved Pore Space Utilisation

Task Force Members:

Australia (co-lead), France, IEAGHG, Japan, UAE &
United Kingdom (co-lead).



Purpose

To investigate the existing capabilities in improved pore space utilisation for CO₂ storage

- Summarize effectiveness and readiness of the various techniques
- Technical proposals for necessary R&D to develop capability in most opportune technologies

Members: Australia, France, IEAGHG, Japan, UAE and the United Kingdom (UK)

- any additional CSLF members would be welcomed

Rationale

Many storage cases may be undesirably costly relative to the pore space 'resource' utilised and large monitoring footprint.

- Utilised storage capacity is $\sim 1 - 4 \%$ of the pore space resource
- Large lateral spread of CO_2 relative to the volume stored

Improved pore space utilisation may be very beneficial to:

- increased storage capacity,
- reduced monitoring costs, and
- increased ability for 'hub' style storage operations.



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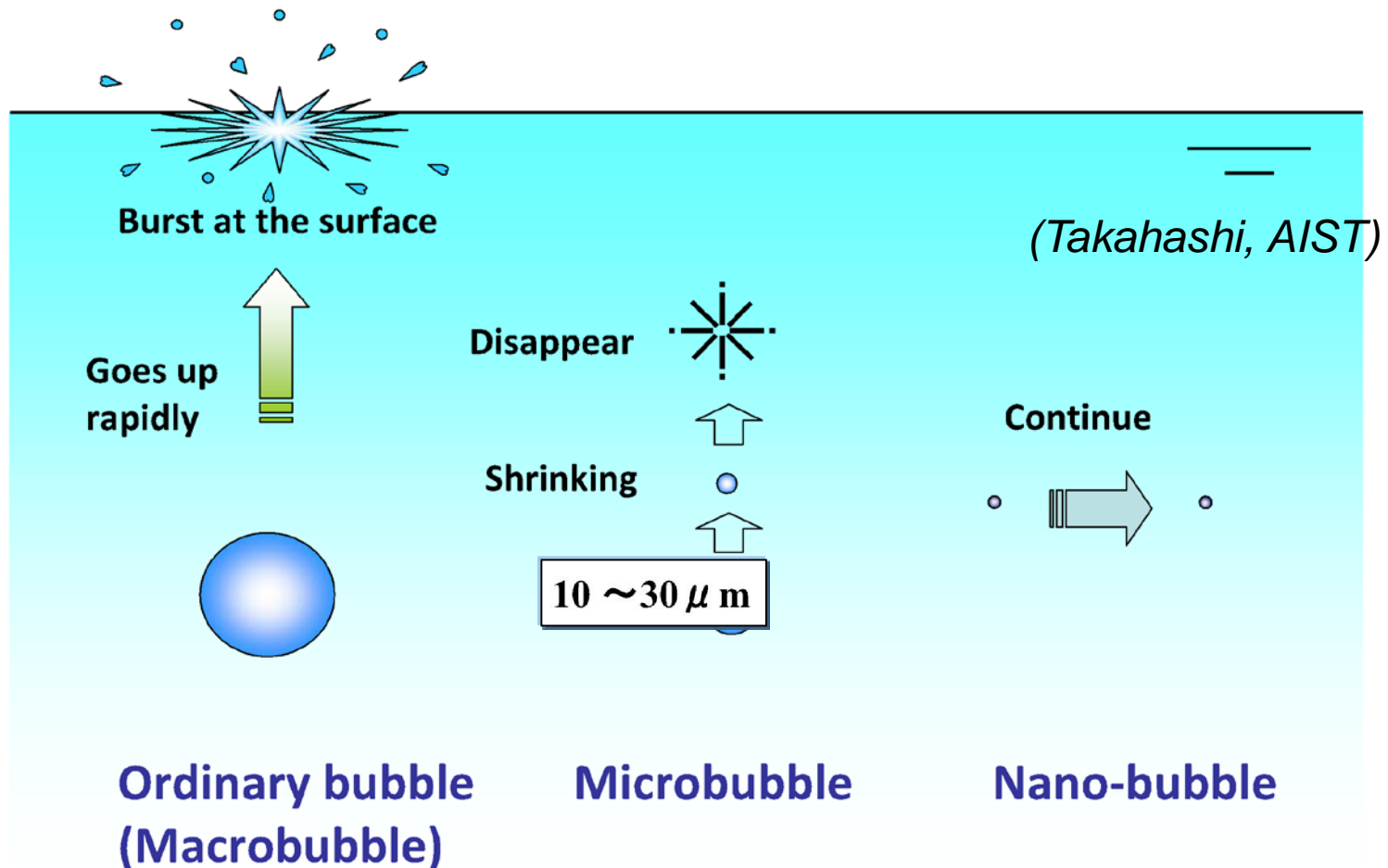
Technical Report Contents

- Well Design:
 - Vertical or deviated wells; Perforation design; flow control
- Injection Operations
 - Pressure management; plume steering; well cycling; EOR (UAE)
- Reservoir Stimulation
 - geochemically enhanced injectivity
- Modified Injection
 - Micro-bubble injection (Japan); CO₂ saturated water injection (France)
- Heterogeneous Reservoir Storage (Australia)
 - Tortuous migration pathway; improved sweep in low permeability reservoir (Japan); rock types for higher residual trapping

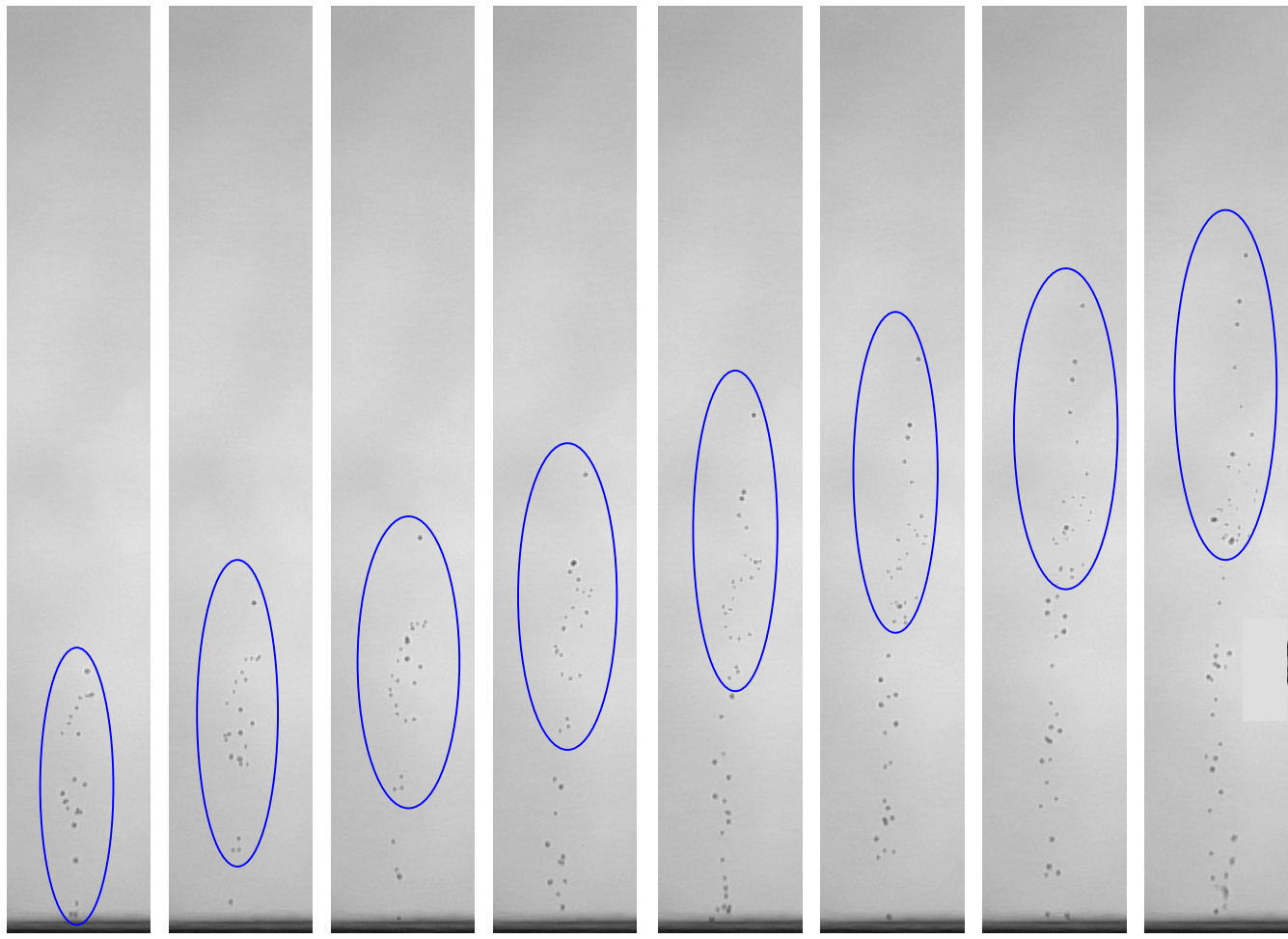
What's Micro-bubbles?



- ✓ Small size
- ✓ High solubility
- ✓ Low buoyancy



Dissolution of CO₂ micro bubbles



○ Swarm of microbubbles (Diameter: 200 μ m~50 μ m) time step : 0.34 sec

Observe *shrinking* and *dissolution* of CO₂ microbubbles by image analysis



Schedule

- June 2016:
 - Activities populated by member in accordance to technology suite being investigated
- Oct 2016:
 - Task Force basis understood
 - technical reviews well underway
- April 2017:
 - Initial draft complete
 - Submitted for CSLF member review
- Oct 2017:
 - Member inputs incorporated
 - Final report submitted
 - Key technology development proposals



Next Steps

- New Members in order to cover all activities