A practical resource for common modelling approaches in simulating planetary volatiles

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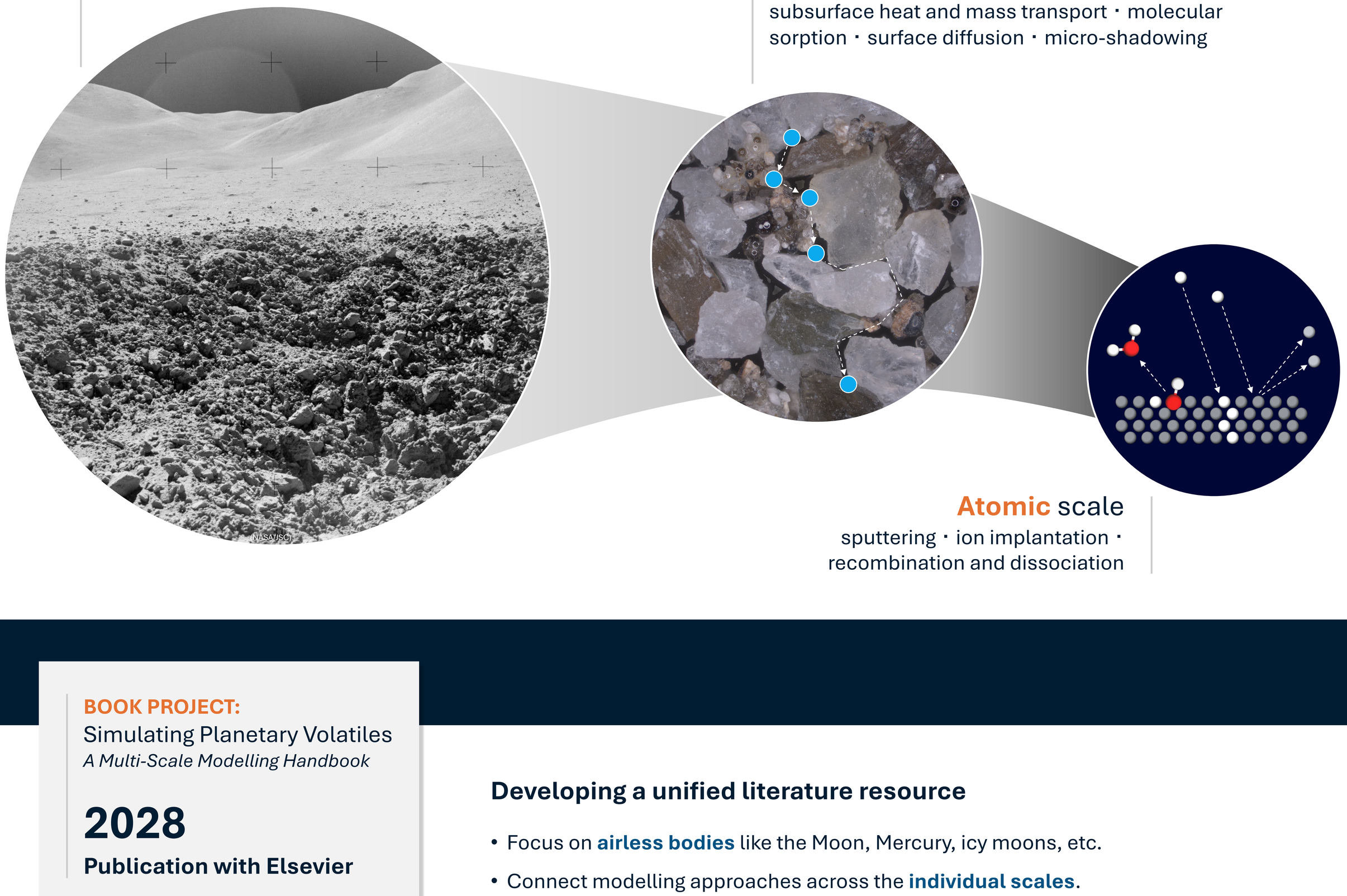
ERC PROJECT:
VOLARIS
Volatile dynamics and regolith interactions on solar system bodies

Modelling the lunar volatile cycle

- Lunar volatile science spans **multiple disciplines** across a wide range of **spatial and temporal scales**.
- Methods are often **highly specialised**, applied individually, and reported in fragmented literature.
- Combining methods and models is computationally challenging and requires **suitable simplifications**.

Macro scale
migration processes · ballistic transport · illumination conditions · accumulation of deposits

Grain scale
subsurface heat and mass transport · molecular sorption · surface diffusion · micro-shadowing



Atomic scale
sputtering · ion implantation · recombination and dissociation

BOOK PROJECT:
Simulating Planetary Volatiles
A Multi-Scale Modelling Handbook

2028
Publication with Elsevier

Developing a unified literature resource

- Focus on **airless bodies** like the Moon, Mercury, icy moons, etc.
- Connect modelling approaches across the **individual scales**.
- Bridge the gap between **fundamental theory and practical application**.
- Provide a **step-by-step introduction** to modelling techniques.
- Create an essential resource for **early-career researchers and graduate students**.

Foundations	theory, assumptions, limitations, applicability	**Method comparisons**	trade-offs across scales
Practical guides	method selection, implementation, validation	**Use cases & exercises**	worked examples for learning and reuse

Read the abstract

References
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VOLARIS

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