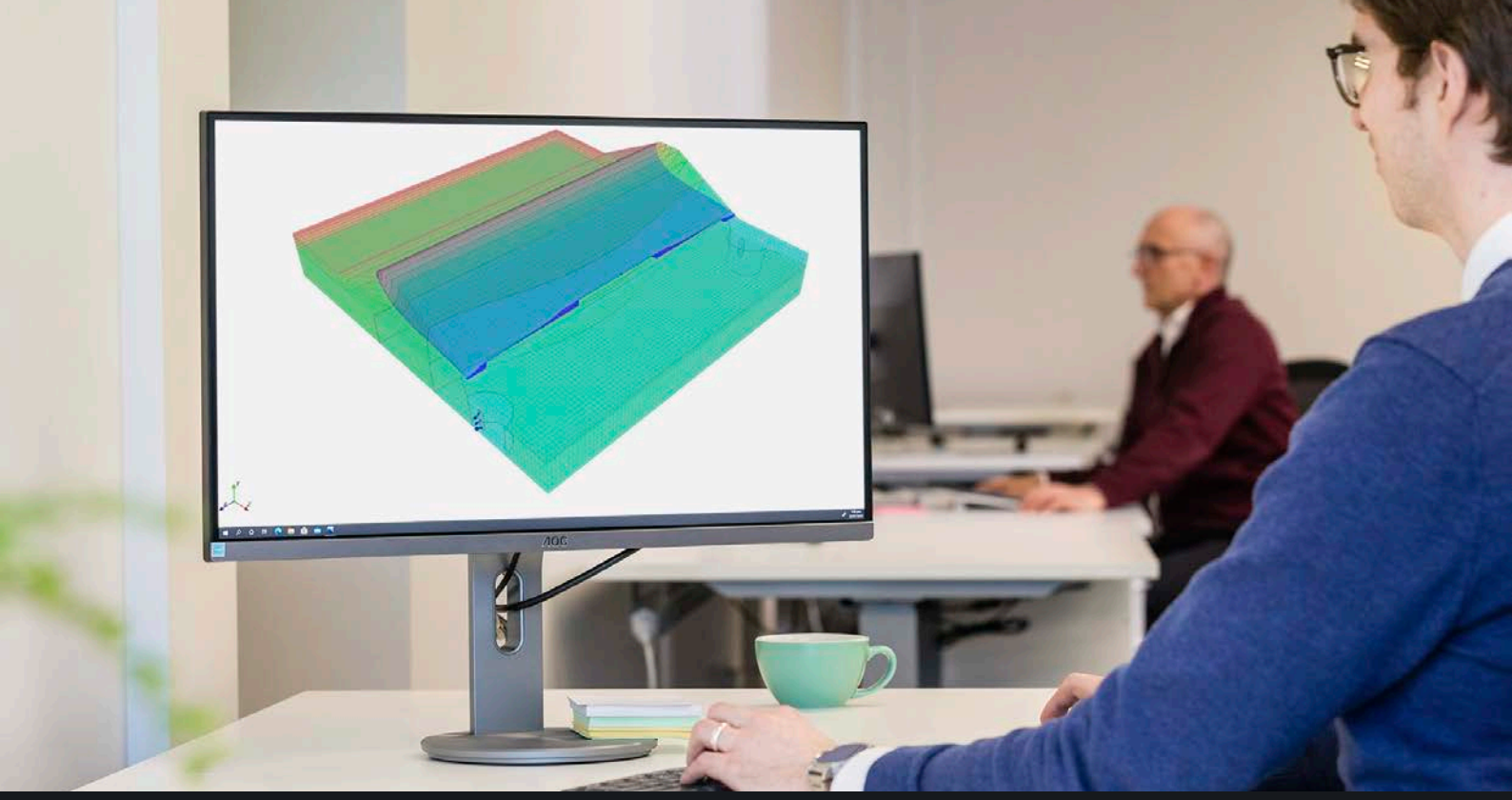
SEEQUENT

SEEP/W

SEEP3D

Groundwater Flow Analysis

GeoStudio



SEEP/W is a powerful finite element software product for modeling groundwater flow in porous media. SEEP/W can model simple saturated steady-state problems or sophisticated saturated / unsaturated transient analyses with atmospheric coupling at the ground surface.

Add SEEP3D to SEEP/W to analyze 3D groundwater flow using the same comprehensive set of material models and boundary conditions.

Boundary Conditions

SEEP/W supports a range of boundary condition options. Field data or user-specified functional relationships can be inputted to define hydrographs, reservoir fluctuations, rainfall cycles, vegetation effects, or land-climate interactions.

Integration

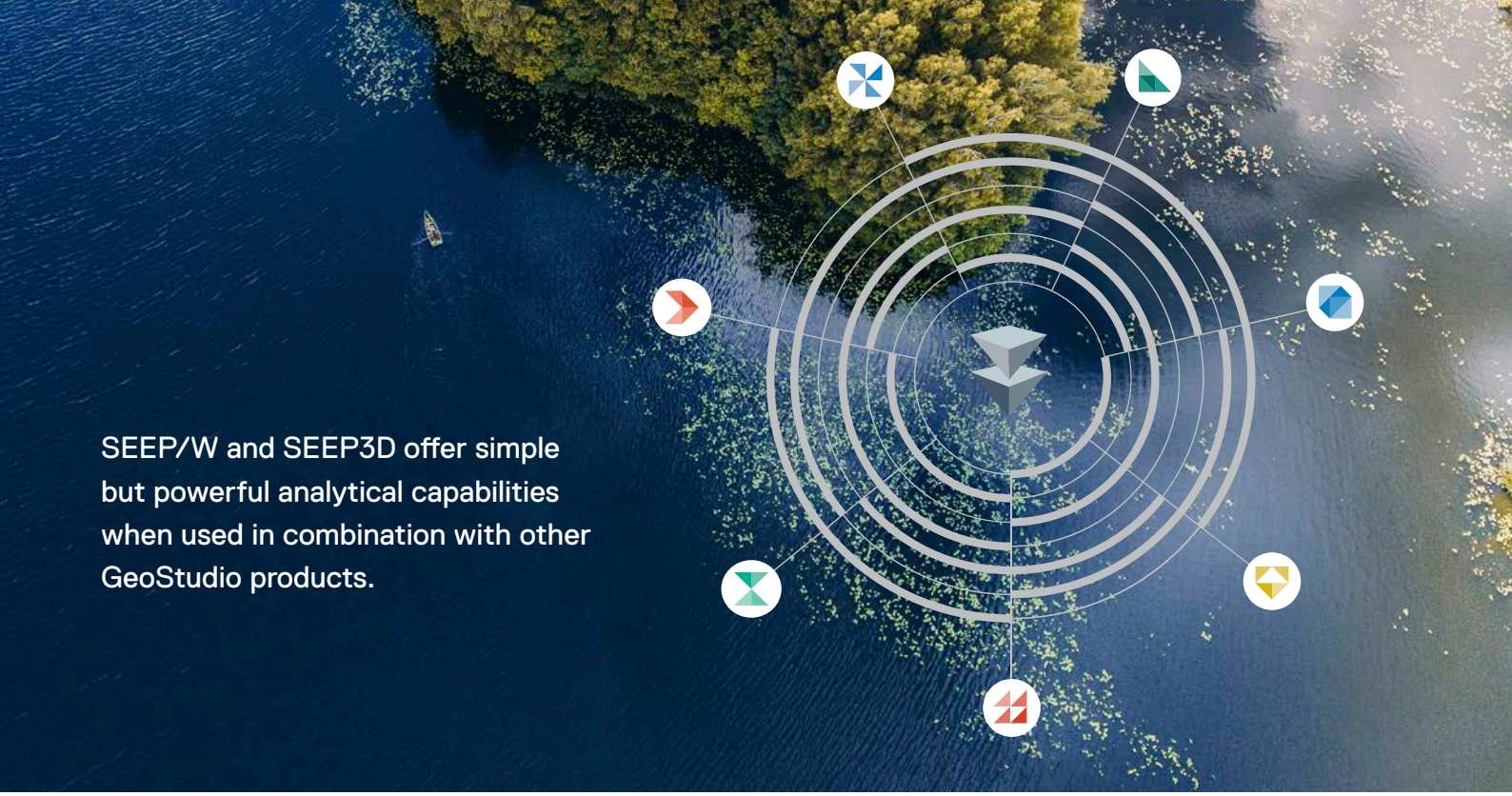
Integration of SEEP/W and SEEP3D with SLOPE/W makes it possible to analyze the stability of any natural or man-made system subject to transient changes in pore-water pressure. Seamlessly combine SEEP/W and SEEP3D, to analyze 2D and 3D groundwater flow in the same project file.

Material Properties

Hydraulic conductivity and volumetric water content functions can be estimated using built-in functions. The estimation process requires only fundamental information. A saturated-only material model is also available.

Saturated/Unsaturated

The rigorous saturated/unsaturated formulation of SEEP/W means that even the most demanding flow problems, such as infiltration into dry soil or seepage through complex upstream tailings dams, can be analyzed with ease.



SEEP/W and SEEP3D offer simple but powerful analytical capabilities when used in combination with other GeoStudio products.

PWP integration with SIGMA/W

Excess pore-water pressures generated in SIGMA/W by external loads (e.g., fill placement) can be used as initial conditions in a transient SEEP/W analysis. The simulated dissipation rates can be used to develop construction-staging schedules. SEEP/W pore-water pressures can be used by SIGMA/W to simulate in situ effective stresses.

Integrated heat transfer with TEMP/W

Temperature variation throughout the domain may cause density dependent fluid flow, while water movement carries heat and thus, redistributes the temperatures in the domain. Coupling SEEP/W+ SEEP3D and TEMP/W+TEMP3D allows for the simulation of density dependent fluid flow (or free convection) and forced convection heat transfer.

Integrated solute transfer with CTRAN/W

Water velocity is often an important component of contaminant transport, while concentration variations may cause density dependent fluid flow. Both advection-dispersive contaminant transport and density dependent fluid flow can be modeled by coupling SEEP/W+SEEP3D and CTRAN/W+ CTRAN3D.

SEEP/W models a full range of groundwater problems

Groundwater flow systems

Understanding the flow dynamics of a hydrogeological system is often the cornerstone of geo-engineering and earth science projects. SEEP/W+SEEP3D can be used to analyze small-scale and large-scale groundwater flow systems comprising simple to complex stratigraphy and topography. Integration with CTRAN/W+SEEP3D and/or TEMP/W+SEEP3D provides the flexibility to incorporate density-dependent and frozen ground effects on the movement of groundwater.

Subsurface dewatering applications

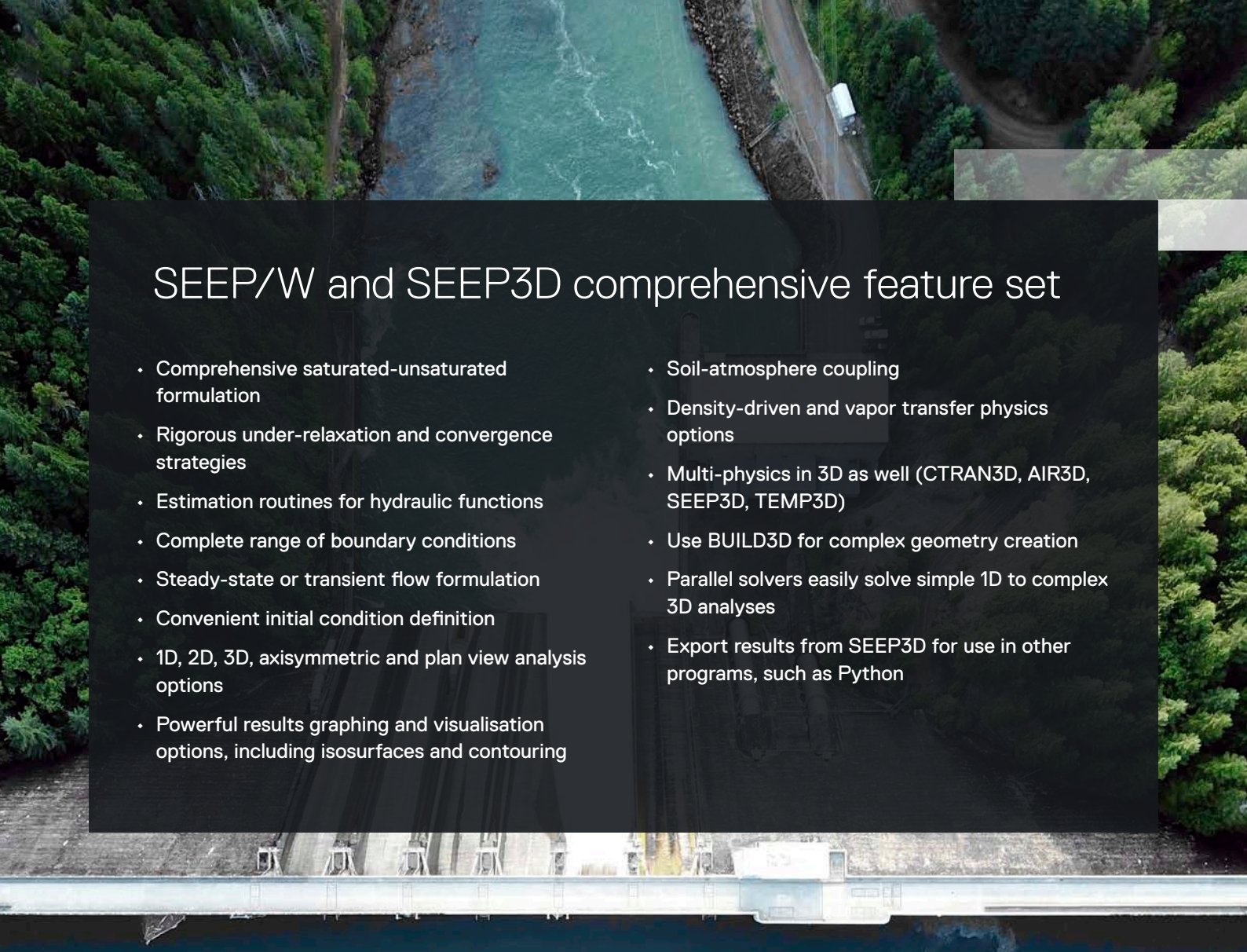
SEEP/W and SEEP3D can be used to analyze and design subsurface dewatering systems for civil infrastructure, construction, and mining projects. The axisymmetric formulation is often used to analyze drawdown due to pumping wells or to conduct numerical simulations of drawdown tests. Plan view analysis provides an expedient approach for the design of well-spacing patterns, while the rigorous 2D and 3D formulation provides the power to analyze de-watering systems in mine slopes, infrastructure embankments such as bridge abutments, construction excavations, and more.

Dams and levees

SEEP/W and SEEP3D are used worldwide to analyze and design hydraulic structures subjected to a wide-range of anthropogenic and natural forces. From simple homogenous levees to large-scale tailings dams with complex internal drainage systems, SEEP/W is able to achieve results for even the most difficult seepage problems. The transient formulation and sophisticated boundary condition options allow SEEP/W to analyze flood events, rapid drawdown, and the effect of severe climate.

Soil cover design

The rigorous saturated-unsaturated formulation combined with a sophisticated land-climate interaction boundary condition can be used to model and design cover systems for mining and municipal waste facilities. Integration with CTRAN/W or TEMP/W allows for the analysis of solute and gas transport or thermally-driven vapor flow through cover systems.



SEEP/W and SEEP3D comprehensive feature set

- Comprehensive saturated-unsaturated formulation
- Rigorous under-relaxation and convergence strategies
- Estimation routines for hydraulic functions
- Complete range of boundary conditions
- Steady-state or transient flow formulation
- Convenient initial condition definition
- 1D, 2D, 3D, axisymmetric and plan view analysis options
- Powerful results graphing and visualisation options, including isosurfaces and contouring
- Soil-atmosphere coupling
- Density-driven and vapor transfer physics options
- Multi-physics in 3D as well (CTRAN3D, AIR3D, SEEP3D, TEMP3D)
- Use BUILD3D for complex geometry creation
- Parallel solvers easily solve simple 1D to complex 3D analyses
- Export results from SEEP3D for use in other programs, such as Python

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