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Sommario/riassunto	The representation of the Earth's surface in global monitoring and forecasting applications is moving towards capturing more of the relevant processes, while maintaining elevated computational efficiency and therefore a moderate complexity. These schemes are developed and continuously improved thanks to well instrumented field-sites that can observe coupled processes occurring at the surface-atmosphere interface (e.g., forest, grassland, cropland areas and diverse climate zones). Approaching global kilometer-scale resolutions, in situ observations alone cannot fulfil the modelling needs, and the use of satellite observation becomes essential to guide modelling innovation and to calibrate and validate new parameterization schemes that can support data assimilation applications. In this book, we review some of the recent contributions, highlighting how satellite data are used to inform Earth surface model development (vegetation state and seasonality, soil moisture conditions, surface temperature and turbulent fluxes, land-use change detection, agricultural indicators and irrigation) when moving towards global km-scale resolutions.