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The Solar Energy Nowcasting SystEm (SENSE): Pilot applications and validation of results

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In the framework of the GEO-CRADLE project (http://geocradle.eu/en/), we present a novel Solar Energy Nowcasting SystEm (SENSE; http://solea.gr/), with main scope the operational application for energy-related end-users in Europe, North Africa and Middle East from the public and private sectors. SENSE is a real time system, based on the synergy of neural networks, radiative transfer simulations, real-time cloud inputs from MSG/SEVIRI satellite retrievals and CAMS aerosol forecasts. It is capable of producing high resolution (1nm, 0.05 degrees, 15 min) maps of spectrally-integrated irradiances of the order of 100,000 pixels within a minute. The whole approach is validated against MODIS observations, BSRN ground-based measurements and a high spectrally precision instruments (PSR), under clear sky and cloudy conditions and under high aerosol loads, indicating the usefulness and accuracy for PV and CSP installations, efficient energy planning and related policies.