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## Directional and frequency spread of surface ocean waves from CFOSAT/SWIM satellite measurements

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The CFOSAT (China France Oceanography Satellite) mission launched in 2018 now routinely provides at the global scale, directional spectra of ocean waves. The principle is based on the analysis of the normalized radar cross-section measured by the instrument SWIM (Surface Waves Investigation and Monitoring), a near-nadir pointing Ku-Band real-aperture scanning radar. From the ocean wave spectra derived from SWIM, the principal parameters of ocean wave spectra as significant wave height, peak wavelength, and peak direction are now available to better characterize the sea-state. However, it is known that these principal parameters are not sufficient not fully characterize the distribution of wave energy and understand or validate the physical processes impacting its evolution during growth order decay. Here we show that the parameters characterizing the shape of the wave spectra (e.g directional and frequency spread) can be estimated at the global scale from the SWIM measurements. We also show that they can provide consistent values of the Benjamin-Feir index, an index proposed to estimate the probability of extreme waves. Similarities of differences with the shape parameters of the MFWAM numerical wave model are also discussed.