The directional distribution in XBeach and SnapWave is given by:



In SWAN, *m=2s* is used for the power of the distribution function.

The directional spreading is defined as:



Numerical integration of for a range of *s* values yields:



The relationship between *s* and (in radians) is given analytically by:



or inversely:



Alternatively:



or inversely:



The directional distribution according to Longuet-Higgins et al (1963) is given by:



The directional spreading is defined as:



Numerical integration of for a range of *s* values yields:



The relationship between *s* and is given analytically by:



or inversely:

