

Introduction

A sphere is not likely to be a good representative of the shape of the average aquatic particle for two main reasons: (1) the majority of marine particles are not spherical, and (2) of all the convex shapes a sphere is rather an extreme shape: for a given particle volume it has the smallest surface area-to-volume ratio. Only a limited number of studies have examined the IOPs of non-spherical marine particles and results indicate a strong dependence of optical properties, in particular scattering, on shape (Kirk (1976), Aas (1984), Voss and Fry (1984), Jonasz (1987), Volten et al. (1998), Gordon and Du (2001), Herring (2002), MacCallum et al. (2004), Quirantes and Bernard (2004), Quirantes and Bernard (2006), and Gordon (2006)).

Methodical evaluation of shape effects on IOPs are presented in two non-peer-reviewed publications (Aas (1984) and Herring (2002)), a short book chapter (Jonasz (1987)), and in Clavano et al. (2007). A summary of the most pertinent results follows.

For particles much smaller than the wavelength of light the inherent optical properties of non-spherical particles are similar to those of sphere with the same volume. For randomly oriented convex particles much larger than the wavelength of light (geometric optics limit) the absorption, scattering and attenuation are similar to those of a sphere with a similar average cross-sectional area.