Surface Area of the Exposed Eye

I read with interest the recent investigation by Glasgow[1] and was very impressed by the scientific approach to examine the surface layers. However, in estimating the likelihood of phospholipids being on the surface of the tear film, he quotes from Campbell et al. (ref 26) for the surface area of the tear film; this being $3.5 \times 10^7 Å^2$. This value from Campbell et al. is clearly wrong and it is difficult to discern where this calculation came from. Campbell et al. refer to a paper by Zaman et al., who measured a mean maximum palpebral height over a 5-minute period. This is the maximum height of the palpebral aperture before the next blink. From this, they estimate the surface area of the eye and use a formula to account for the curvature. Without going into details, their calculation is actually an underestimate because it does not account for the conjunctival regions. Nevertheless, they come up with a surface area of approximately 1.3 cm^2. My estimate of the surface area of the exposed eye is approximately 2 cm^2. Even if we halve this value, 1 cm^2 represents $10^8 \times 10^8$ $Å^2$ (10^{16} $Å^2$). Clearly, this value is in excess of the value reported by Campbell et al., and so I think that the Glasgow data should be reappraised in the light of a much larger surface area for exposed surface of the eye (the tear film area). By my calculations, using this value as the surface area, it is very clear that only a minute proportion of molecules on the surface could be phospholipids; in reality, hardly any.

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Reference

1. Glasgow BJ. Evidence for phospholipids on the surface of human tears. *Invest Ophthalmol Vis Sci*. 2020;61(14):19, *https://doi.org/10.1167/iovs.61.14.19*.

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