Angular distribution of quiet-sun magnetic fields

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Abstract.   Due to the highly non-linear relation between linear polarization and transverse flux density the conversion of Stokes Q and U data to flux density is very sensitive to the way one deals with magnetic structuring on sub-pixel scales. Using the powerful observational constraints provided by 6302/6301 Stokes V and I line ratios extracted from the Hinode SOT/SP data, we have accounted for the influence of the subresolution structuring in deriving the flux densities. We find that the angular distribution is nearly isotropic for the smallest flux densities but rapidly gets strongly peaked around the vertical direction as the flux density increases. This result contradicts earlier claims (based on analysis of the very same Hinode data set) that the horizontal flux densities are on average five times larger than the vertical ones. The reason for this contradiction lies in the different way of dealing with both the subpixel structuring and with the measurement noise (which makes the field seem much more horizontal than it really is).