Supplemental Information

Figure S1. Distribution of hydrogen bonds, formed by waters with the quartz surface and other waters, as a function of angle criterion ϕ_q . Bulk waters within a perpendicular distance of 5 Å from the quartz surface are used to show the dependence of hydrogen bond distributions upon ϕ_q . H₂O-silanol distance is set to <3 Å.

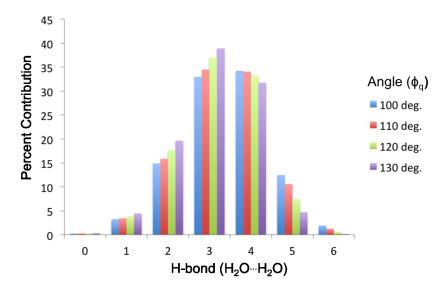
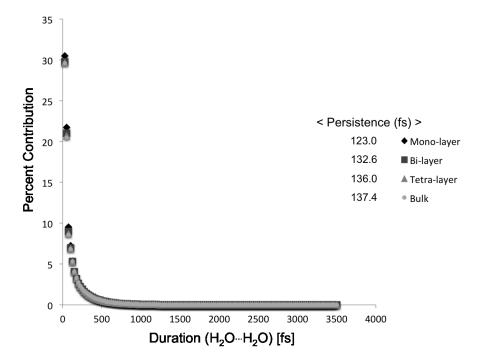


Figure S2. Percent of water-water H-bonds as a function of durations over the layers.



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Figure S3. Percent of silanol-water hydrogen bonds as a function of durations over the hydration layers.

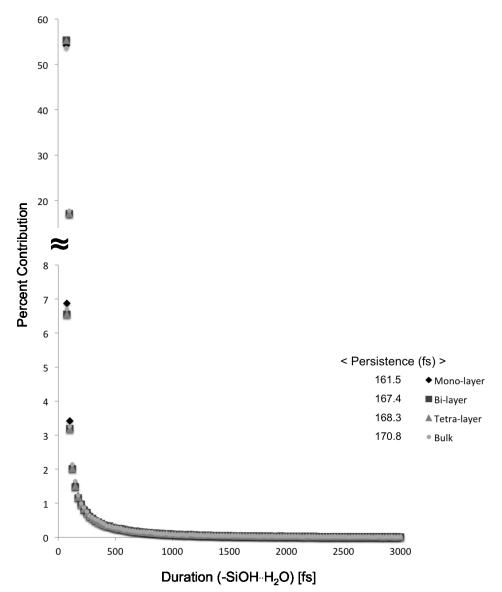


Table S1. Average water dipole angles (α and β) over the hydration levels.

Water/Quartz interface	<dipole angle="" α=""> H-bond donor</dipole>	<dipole angle="" β=""> H-bond acceptor</dipole>
Mono-layer	124.8	56.0
Bi-layer	125.0	50.9
Tetra-layer	125.0	50.5
Bulk	125.3	50.3

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