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Evaporating droplets NOUSHINE SHAHIDZADEH-BONN, Laboratoire des Materiaux et Structures du Genie Civil (LMSGC), SALIMA RAFAI, WZI/University of Amsterdam, AZA AZOUNI, LMSGC, DANIEL BONN, LPS/Ecole Normale Superieure, LMSGC TEAM, LPS/ENS TEAM, WZI/UVA COLLABORATION — In our everyday life we are constantly confronted with evaporating drops and the consequences of it. The seemingly simple problem of an evaporating droplet has attracted a great deal of attention over the past years. The problem is complicated due to the fact that the form of the droplet during the evaporation is a priori unknown, and due to the large number of effects that have to be taken into account (temperature, convection, Marangoni effects…). We consider the very simple situation of the evaporation of a perfectly wetting liquid on a molecularly smooth surface. The radius R(t) of the droplet is followed in time until it reaches zero. If the evaporation is purely diffusive, a radius that decreases as the square root of time is expected; this is indeed found for organic liquids, but water has a different exponent. We show that the difference is likely to be due to the fact that water vapor is lighter than air, and the vapor of other liquids more dense. If we carefully confine the water so that the diffusive boundary layer may develop, we retrieve the square root of time behavior. On the other hand, if we force convection for an organic liquid, we retrieve the anomalous exponent for water.

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