Formation of chromospheric and coronal loops as a result of flux emergence

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A spectacular manifestation of solar activity is the appearance of transient brightenings in the far wings of the H(alpha) line, known as Ellerman bombs (EBs). Recent observations obtained by the Interface Region Imaging Spectrograph (IRIS) have revealed another type of plasma ``bombs'' (UV bursts) with higher temperatures. Here, we report on 3D radiative magneto-hydrodynamic simulations of magnetic flux emergence in the solar atmosphere. We find that ubiquitous reconnection between emerging bipolar magnetic fields can trigger EBs in the photosphere, UV bursts in the mid/low chromosphere and small (nano-/micro-) flares in the upper chromosphere. These results provide new insights on the emergence and build up of the coronal magnetic field and the formation of coronal loops.