Upflows in the quiet Sun – a highly active place

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The solar corona is the outermost layer of the Sun, which extends far into the open space. It is characterised by temperatures of up to several million degrees Celsius, but extremely low densities. Those contradictory conditions are still not fully understood and are known as the "Coronal heating problem". The solar corona itself can be separated into three different regions: first the active regions, which are big bright and dynamic features; second the quiet Sun, which are regions with only small and weak features and third the coronal holes, which are colder and nearly featureless regions. Furthermore, the solar corona is known as being the source of the solar wind, which is an omnipresent stream of highly energetical particles and electromagnetic fields. Leaving the Sun, the solar wind travels towards the Earth, where it can have strong impacts. The beautiful effects on Earth can be observed as polar lights, but in a modernised world the negative effects dominate. Those can be malfunctions in satellites, disturbances in communication systems and blackouts in electricity systems.

Energetic events in active regions like solar flares and coronal mass ejections are usually seen with a big outflow of plasma. In our previous work, we have used spectroscopic data to show that strong upflows of plasma can be observed even from small-scale features in the quiet Sun and coronal holes. Those small features were previously not considered as sources of strong upflows since they were barely visible in the previous generation of imaging instruments. With the launch of EAS's Solar Orbiter, this has changed drastically since it allows imaging of the solar corona with a much higher spatial and temporal resolution using its Extreme-Ultraviolet Imager. Already the first data has shown a variety of new and highly active small-scale features such as EUV brightenings. In our current work, we use the most recent data from the Solar Orbiter satellite in combination with data from other satellites to investigate the influence of the smallest know coronal features on the solar wind.