

## **The faint radio sky: a tale of three populations**

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### **Abstract**

We present the evolutionary properties and luminosity functions of the radio sources belonging to the Extended *Chandra* Deep Field South (E-CDFS) Very Large Array survey, which reaches a flux density limit at 1.4 GHz of  $32.5 \mu\text{Jy}$  at the field centre and redshift  $\sim 5$ . Our sample, which includes  $\sim 700$  radio sources, is  $\sim 3.5$  times larger than the CDFS one, on which our recent work was based, and is the deepest radio sample for which such results have ever been obtained. The sub-mJy radio sky turns out to be a complex mix of star-forming galaxies and radio-quiet AGN evolving at a similar, strong rate and declining radio-loud AGN. While the well-known flattening of the radio number counts below 1 mJy is mostly due to star-forming galaxies, these sources and AGN make up an approximately equal fraction of the sub-mJy sky. One of the main messages, especially to non-radio astronomers, is that radio surveys are reaching such faint limits that, while previously they were mainly useful for radio quasars and radio galaxies (i.e., non-thermal sources), they are now detecting mostly star-forming galaxies and radio-quiet AGN, i.e., the bulk of the extragalactic sources studied by infrared, optical, and X-ray surveys.