Barrelledness of *p*-adic spaces of strictly differentiable functions

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Let K be a complete non-archimedean rank 1 valued field, let X be a non-empty subset of K without isolated points. On the space D(X) of all continuously differentiable functions $X \to K$ we define the topology of compact convergence of the functions and their first order difference quotients. We consider its dual space: the space of distributions, and show -among other things- that distributions have compact supports. As a result of this study we obtain barrelledness of D(X), and also the surprising fact that D(X) is reflexive if and only if K is not spherically complete.