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Let  $X$  be a quasi-projective, compact scheme over a field of characteristic 0. Recent work shows that given a torsion element  $x \in H^2(X_{et}, G_m)$ , there is an Azumaya algebra  $\Lambda$  on  $X$  admitting an integrable biconnection, i.e. a connection such that  $\nabla(ab) = a\nabla(b) + \nabla(a)b$ , whose cohomology class is  $x$ . We use this to define the *differential Brauer group*  $Br_{\nabla}(X)$  on such a scheme. We use the  $\delta$ -flat topology to give a cohomological interpretation of  $Br_{\nabla}(X)$  and show its relation to the usual Brauer group. If  $X$  is smooth and projective, we illustrate this relationship with respect to Hodge theory. (Received March 19, 2017)