Mainak Poddar* (mpoddar@metu.edu.tr), Mathematics Group, Middle East Technical University, Northern Cyprus Campus, Kalakanli, 99738 Guzelyurt, Mersin 10, Turkey, and Ajay Singh Thakur. Complex and SKT structures on the total space of principal bundles.

We present a new construction of non-Kähler complex manifolds that generalizes the construction of complex structures on compact even dimensional Lie groups by Samelson and Wang, as well as the Calabi-Eckmann construction of complex structures on the product to two odd dimensional spheres. We give sufficient conditions for the existence of SKT structures on a large class of these.

Let $G$ be a complex linear algebraic group and let $K$ be a maximal compact Lie subgroup of $G$. Let $E_K \to M$ be a smooth principal $K$-bundle over a complex manifold $M$. Assume that $E_K \to M$ can be obtained by a smooth reduction of structure group from a holomorphic principal $G$-bundle over $M$. Then $E_K$ (respectively, $E_K \times S^1$) admits a family of integrable complex structures if $K$ has even dimension (respectively, odd dimension).

When $K$ is an even dimensional unitary, special orthogonal or compact symplectic group and $M$ is a projective manifold, we can choose complex structures on $E_K$ so that it admits a family of SKT structures if the characteristic classes of $E_K \to M$ satisfy some simple conditions. Formulas for the Picard group and the algebraic dimension of $E_K$ are obtained when, in addition, $K$ is simply connected. (Received September 25, 2017)