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Daniel P Schultz*, dps23@psu.edu. *cubic modular equations in two variables.*

By adding certain equianharmonic elliptic sigma functions to the q - series coefficients of the Borwein cubic theta functions, an interesting set of six two-variable theta functions may be derived. These theta functions invert the $F_1\left(\frac{1}{3}; \frac{1}{3}; \frac{1}{3}; 1|x, y\right)$ case of Appell's hypergeometric function and satisfy several identities akin to those satisfied by the Borwein cubic theta functions. Previous results of K. Koike and H. Shiga are extended and put into the context of modular equations, resulting in a simpler derivation of their results and well as several new modular equations for Picard modular forms. (Received September 05, 2014)