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abstract	Let Σ be a closed surface, G a compact Lie group, with Lie algebra g, $\xi \colon P \to \Sigma$ a principal G-bundle, let $N(\xi)$ denote the moduli space of central Yang-Mills connections on ξ, for suitably chosen additional data, and let $\roman{Rep}_{\xi}(\Gamma,G)$ be the space of representations of the universal central extension Γ of the fundamental group of Σ in G that corresponds to ξ. We construct smooth structures on $N(\xi)$ and $\roman{Rep}_{\xi}(\Gamma,G)$ and show that the assignment to a smooth connection A of its holonomies with reference to suitable closed paths yields a diffeomorphism from $N(\xi)$ onto $\roman{Rep}_{\xi}(\Gamma,G)$; moreover we show that the derivative of the latter at the non-singular points of $N(\xi)$ amounts to a certain twisted integration mapping. Finally we examine the infinitesimal geometry of these moduli spaces with reference to the smooth structures and, for illustration, we show that, on the moduli space of flat $\roman{SU}(2)$-connections for a surface of genus two which, as a space, is just complex projective 3-space, our smooth structure looks rather different from the standard structure.	**abstract**	Let Σ be a closed surface, G a compact Lie group, with Lie algebra g, and $\xi \colon P \to \Sigma$ a principal G-bundle. In earlier work we have shown that the moduli space $N(\xi)$ of central Yang- Mills connections, for appropriate additional data, is stratified by smooth symplectic manifolds and that the holonomy yields a diffeomorphism from $N(\xi)$ onto a certain representation space $\roman{Rep}_{\xi}(\Gamma,G)$, with reference to suitable smooth structures $C^{\infty}(N(\xi))$ and $C^{\infty}(\roman{Rep}_{\xi}(\Gamma,G))$ where Γ denotes the universal central extension of the fundamental group of Σ. Given an invariant symmetric bilinear form on g^*, we construct here Poisson structures on $C^{\infty}(N(\xi))$ and $C^{\infty}(\roman{Rep}_{\xi}(\Gamma,G))$ in such a way that the mentioned diffeomorphism identifies them. When the form on g^* is non-degenerate the Poisson structures are compatible with the stratifications where $\roman{Rep}_{\xi}(\Gamma,G)$ is endowed with the corresponding stratification and, furthermore, yield structures of a {\it stratified symplectic space\/}, preserved by the induced action of the mapping class group of Σ.		
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