$+ F^{p+2}A^{p+q+1}$. ① $H^q_{DR}(F) = \tilde{B} \times_\rho H^q_{DR}(F)$ where

$\rho : \pi_1 \longrightarrow Aut(H^q_{DR}(F))$ is a representation. and $\tilde{B}$ is a universal covering of B.

② $E_1^{p,q}$

$$E_1^{p,q} \xrightarrow{\ \ \phi\ \ } \Omega^p(H^q_{DR}(F))(U_\alpha)$$

$$\| $$

$$\frac{\{\sum_{\#I=p} \eta_I \wedge dx_I \mid d_y\eta_I = 0\} + F^{p+1}A^{p+q}}{\{\sum_{\#I=p} d_y\phi_I \wedge dx_I \mid \phi_I \in A^{q-1}\} + F^{p+1}A^{p+q}}$$

$$[\sum_{\#I=p} \eta_I \wedge dx_I] \longmapsto \sum_{\#I=p} \bar{\eta}_I \wedge dx_I$$

$$\| \ \ \bar{\varphi}$$

where $\bar{\eta}_I$ is the cohomology class of η_I.

$\Rightarrow$ ϕ is well-defined. $\phi([\sum_{\#I=p} \eta_I \wedge dx_I]) = 0$

$\Rightarrow$ $[\sum_{\#I=p} \eta_I \wedge dx_I] = 0$ since $\eta_I = d\phi_I$. and $\eta_I \wedge dx_I \notin F^{p+1}A^{p+q}$. Clearly ϕ is onto.

$\Rightarrow$ $E_1^{p,q}$ may be considered as the p-forms on B with values in the bundle $H^q_{DR}(F)$, i.e. $E_1^{p,q} = \Omega^p(H^q_{DR}(F))(M) = A^q(M) \otimes H^q_{DR}(F)$.

③

$$\begin{tikzcd}
E_1^{p,q} \arrow[r, "d_0"] \arrow[d] & E_1^{p+1,q} \arrow[d] \\
\Omega^p(H^q_{DR}(F)) \arrow[r] & \Omega^{p+1}(H^q_{DR}(F))
\end{tikzcd}$$

$$\begin{tikzcd}
{[\sum_{\#I=p} \eta_I \wedge dx_I]} \in E_1^{p,q} \arrow[r, mapsto] \arrow[d] & {[\sum_{\#I=p} d_x\eta_I \wedge dx_I]} \in E_1^{p+1,q} \arrow[d] \\
\sum_{\#I=p} \bar{\eta}_I \wedge dx_I \in \Omega^p(H^q_{DR}(F)) & \Omega^{p+1}(H^q_{DR}(F)) \ni \sum_{\#I=p} \overline{d_x\eta_I} \wedge dx_I
\end{tikzcd}$$