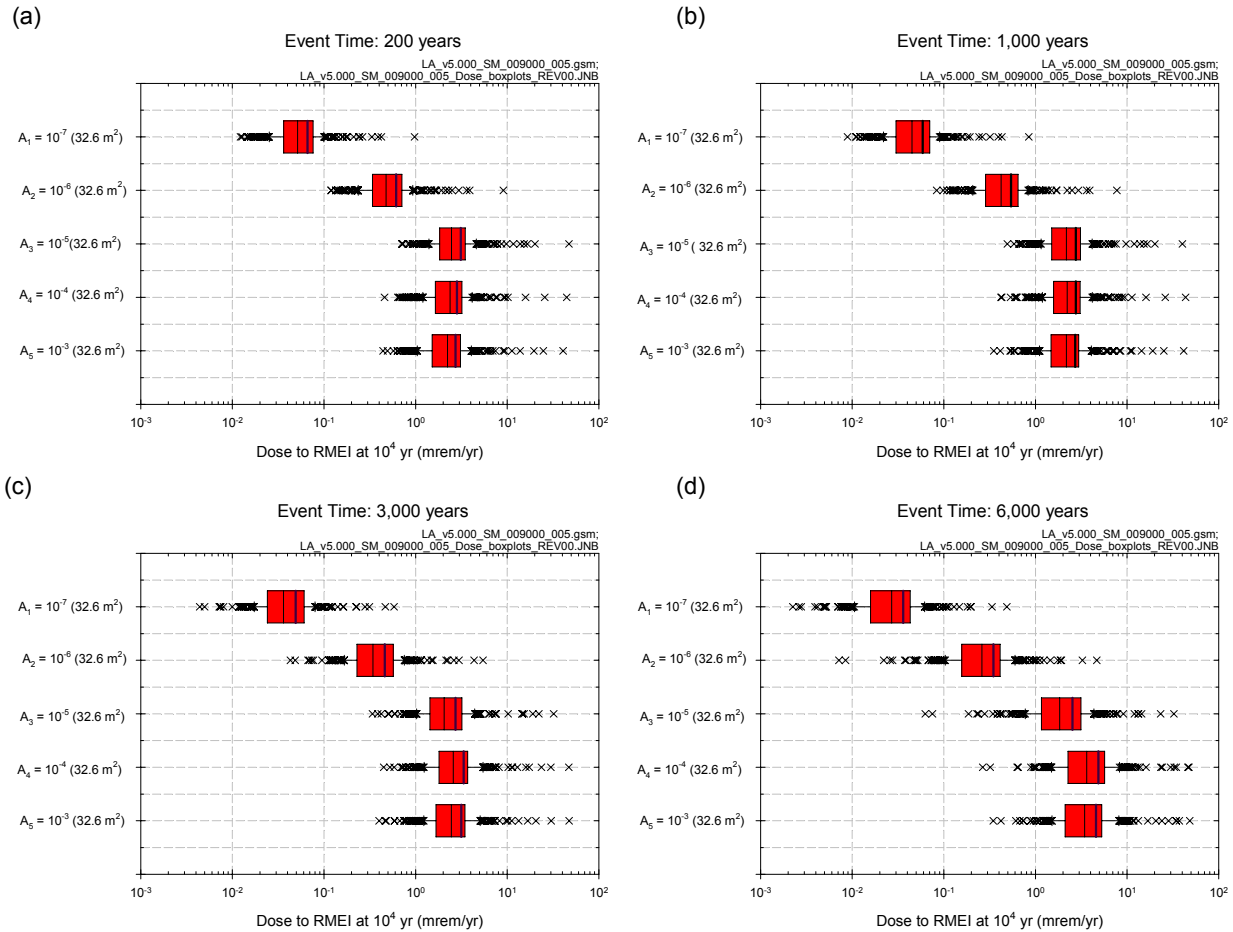


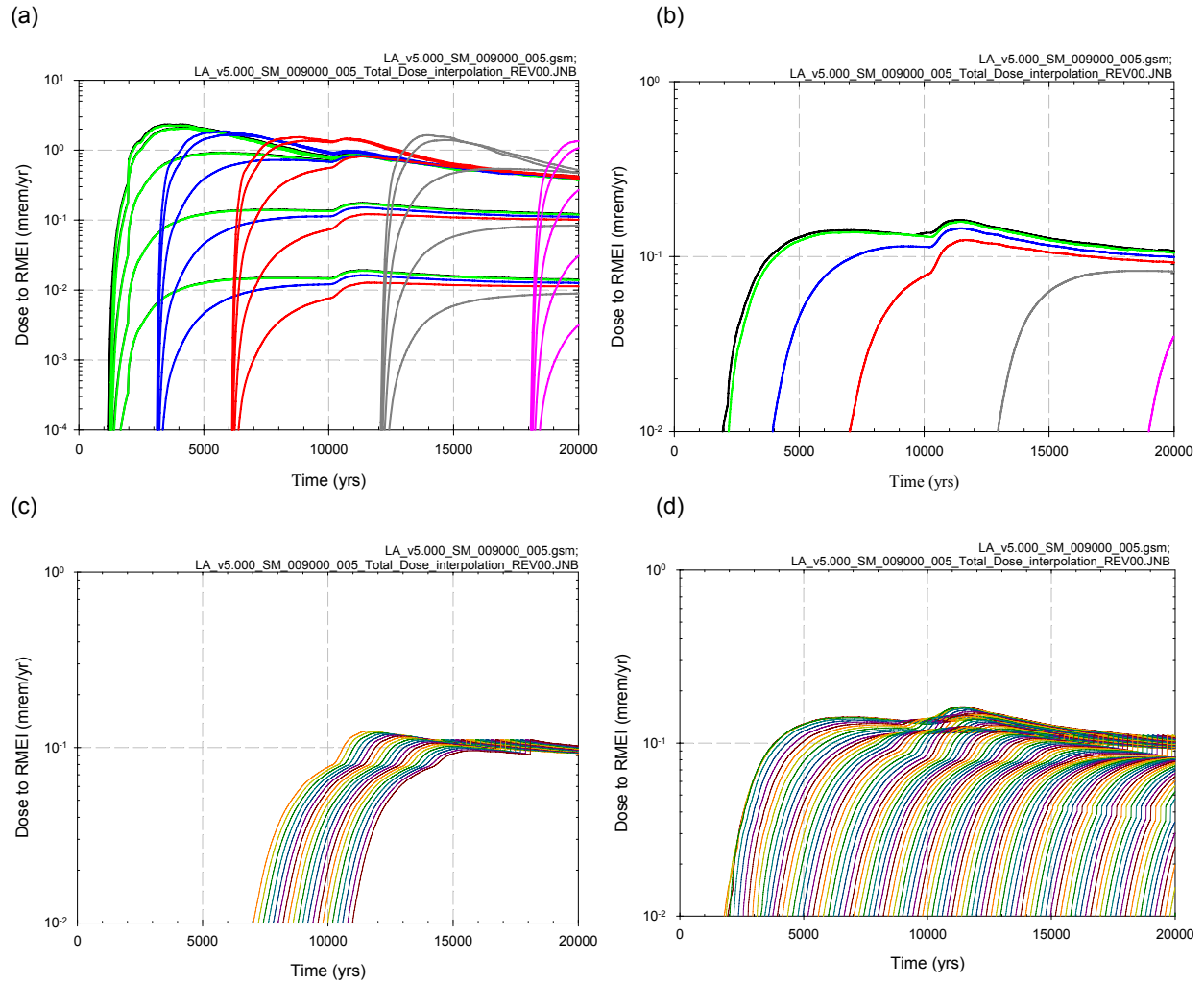
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-1. Summary of results for damage to CDSP WPs obtained with LHS of size $n_{LHS} = 300$ showing epistemic uncertainty in doses $D_{SG}(\tau|[1, t_i, A_s], \mathbf{e}_{Mi})$ for $0 \leq \tau \leq 20,000$ yr damaged area $A_s = (10^{-6})$ (32.6 m^2) and the following values for event time t_i : (a) 200 yr, (b) 1000 yr, (c) 3000 yr, (d) 6000 yr, (e) 12,000 yr, and (f) 18,000 yr.



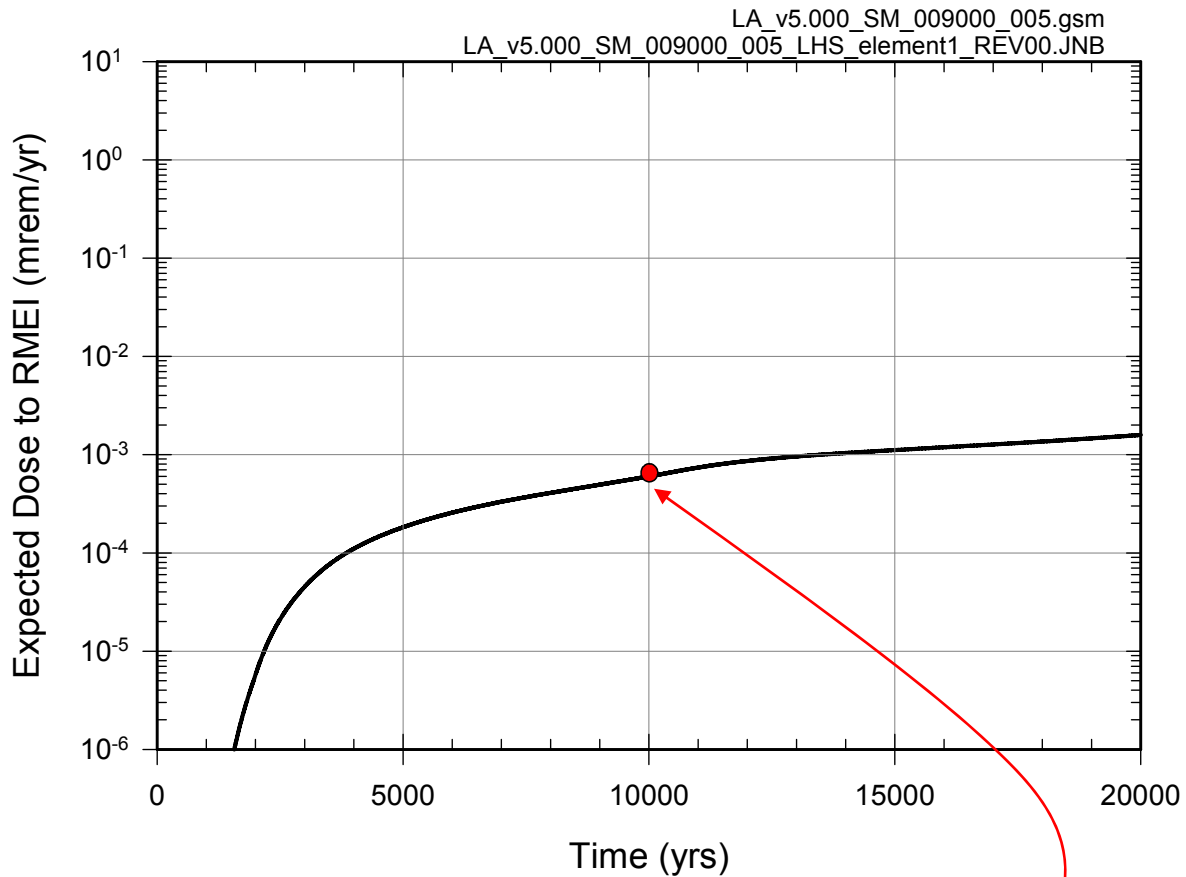
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-2. Box plots (see Figure J6.2-3 for description) summarizing results for damage to CDSP WPs obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in dose $D_{SG}(\tau[1, t_r, A_s], \mathbf{e}_{Mi})$ with $t_r = 200, 1000, 3000,$ and 6000 yrs, $A_s = 10^{-8+s}$ (32.6 m^2) for $s = 1, 2, 3, 4, 5,$ and $i = 1, 2, \dots, nLHS = 300,$ where 32.6 m^2 is the assumed surface area for a CDSP WP: (a) $t_r = 200$ yrs, (b) $t_r = 1000$ yrs, (c) $t_r = 3000$ yrs, and (d) $t_r = 6000$ yrs.



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

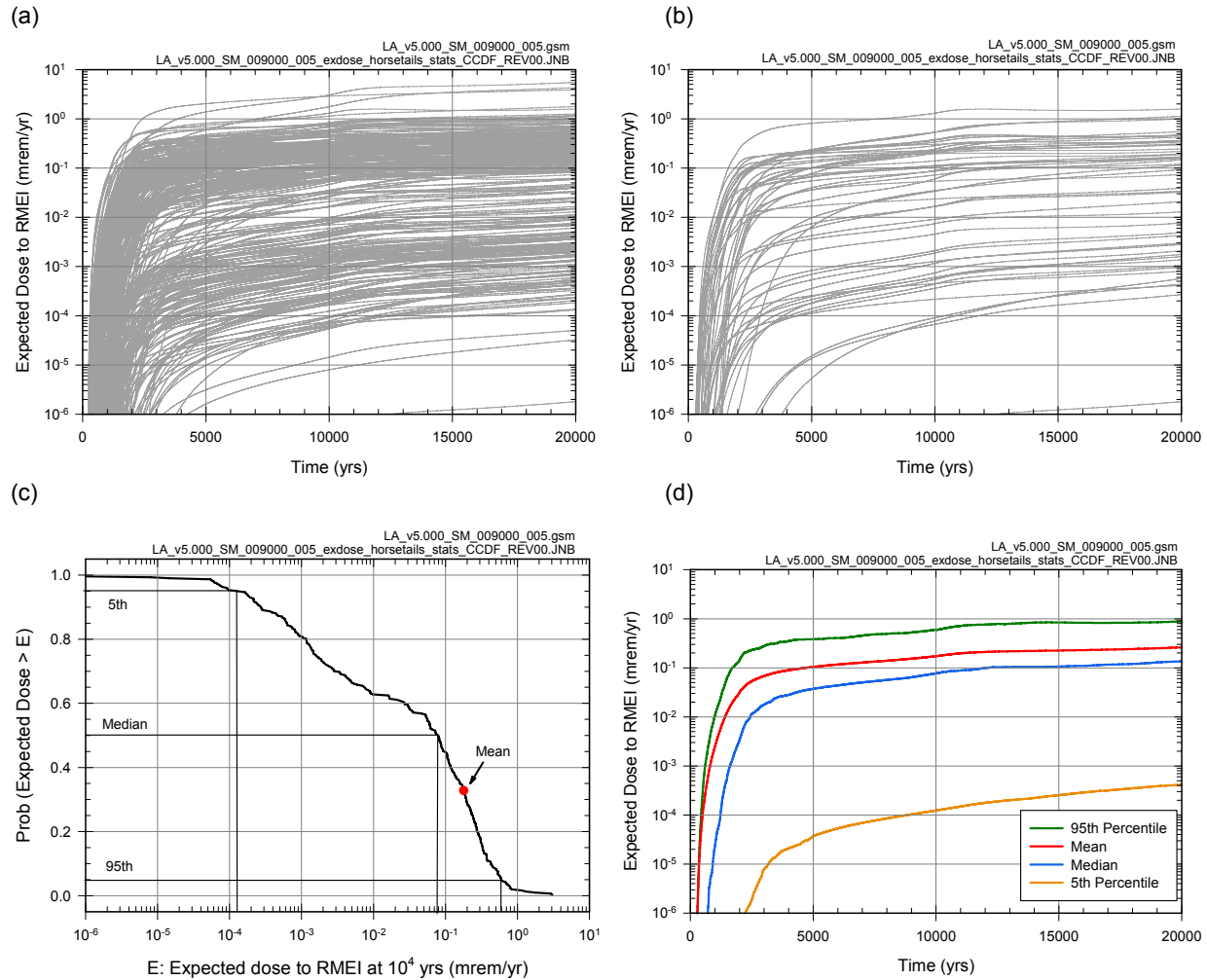
Figure J8.3-3. Illustration of interpolation procedure to obtain estimated integrals $\hat{I}_1(\tau|t, \mathbf{e}_{M1})$ from calculated doses $D_{SG}(\tau|[1, t_r, A_s], \mathbf{e}_{M1})$ indicated in Equation J8.3-9 for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and the time interval $[0, 2.0 \times 10^4 \text{ yr}]$: (a) $D_{SG}(\tau|[1, t_r, A_s], \mathbf{e}_{M1})$, $r = 1, 2, \dots, 6$ and $s = 1, 2, \dots, 5$, (b) $\hat{I}_1(\tau|t_r, \mathbf{e}_{M1})$, $r = 1, 2, \dots, 6$, (c) interpolated values $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_{M1})$ for \hat{t}_k between $t_4 = 6000 \text{ yrs}$ and $t_5 = 12,000 \text{ yrs}$, and (d) interpolated values for $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_1)$ for \hat{t}_k between = 100 yrs and 20,000 yrs.



$$\begin{aligned} \bar{D}_{SG}(\tau|\mathbf{e}_1) &= \int_0^\tau (\lambda_1(\mathbf{e}_1) \exp[-\lambda(\mathbf{e}_1)t]) \left(\int_{\mathcal{A}_1} D_{SG}(\tau|[1, t, A], \mathbf{e}_{M1}) d_{A1}(A|\mathbf{e}_1) dA \right. \\ &\quad \left. + \int_0^\tau \left[\int_{\mathcal{A}_2} D_{SG}(\tau|[1, \tilde{t}, A], \mathbf{e}_{M1}) d_{A2}(A|\mathbf{e}_1) dA \right] \lambda_2(\mathbf{e}_1) d\tilde{t} \right) dt \\ &\cong \sum_{j=1}^n (\lambda_1(\mathbf{e}_1) \exp[-\lambda_1(\mathbf{e}_1)\hat{t}_{j-1}]) \left(\hat{I}_1(\tau|\hat{t}_j, \mathbf{e}_1) + \sum_{k=j+1}^n [\hat{I}_2(\tau|\hat{t}_{k-1}, \mathbf{e}_1)] \lambda_2(\mathbf{e}_1) \Delta\hat{t}_k \right) \Delta\hat{t}_j \\ &= 6.00 \times 10^{-4} \text{ mrem/yr for } \tau = 10,000 \text{ yr} \end{aligned}$$

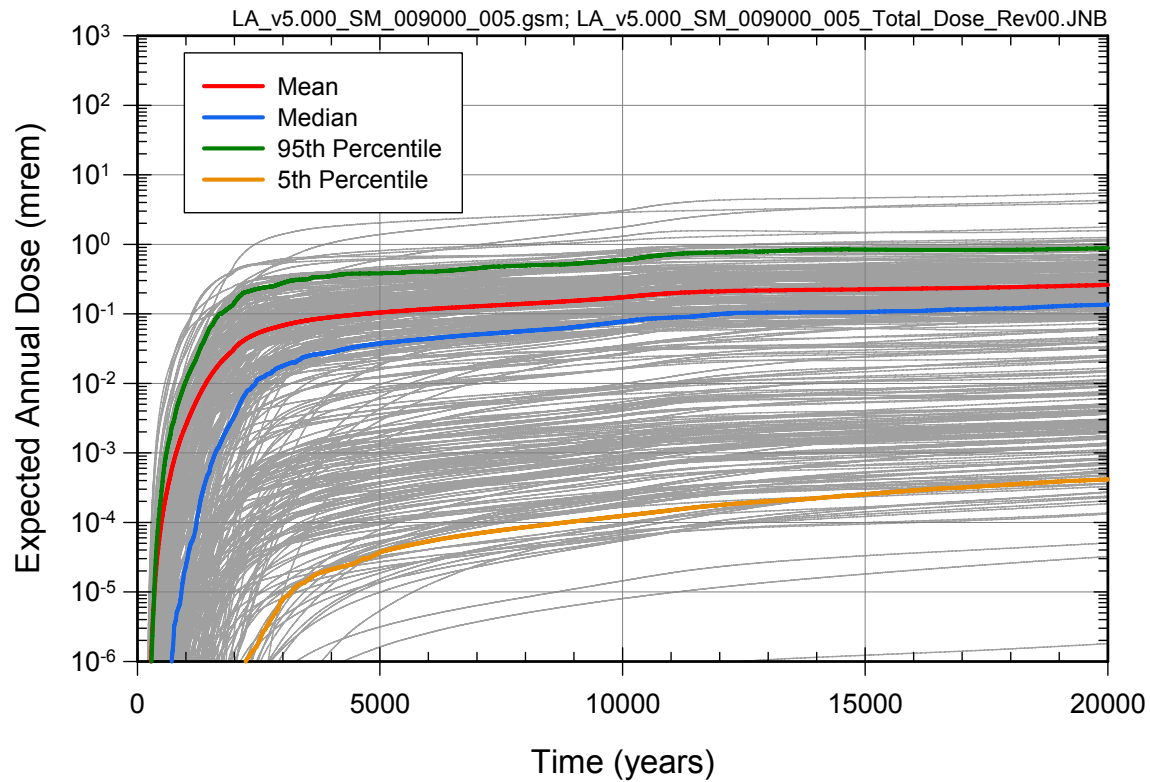
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-4. Estimate of $\bar{D}_{SG}(\tau|\mathbf{e}_1)$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and $0 \leq \tau \leq 20,000$ yr with integration-based procedure indicated in Equation J8.3-13.



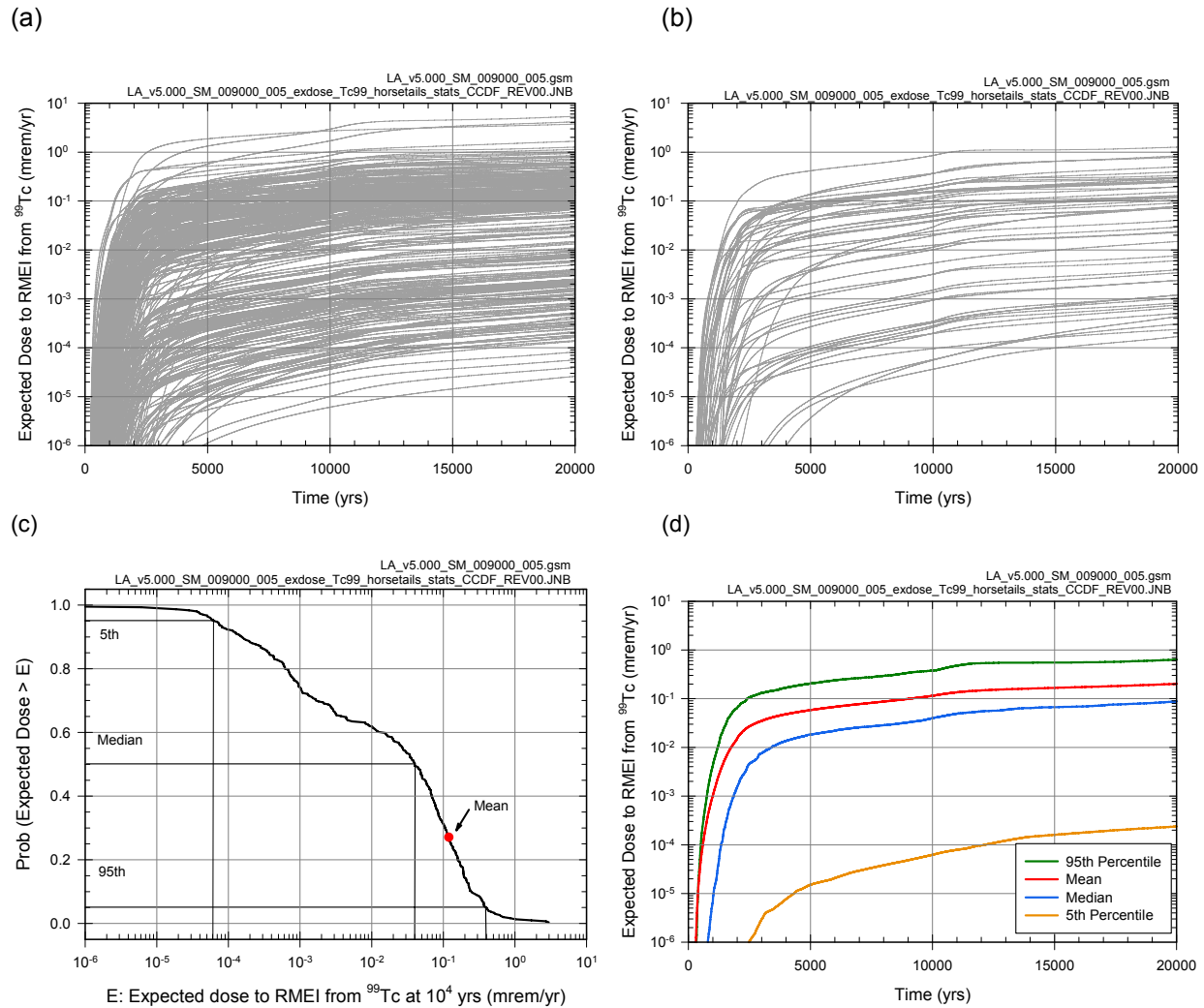
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-5. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when only seismic ground motion events are considered: (a) expected dose $\bar{D}_{SG}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SG}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SG}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



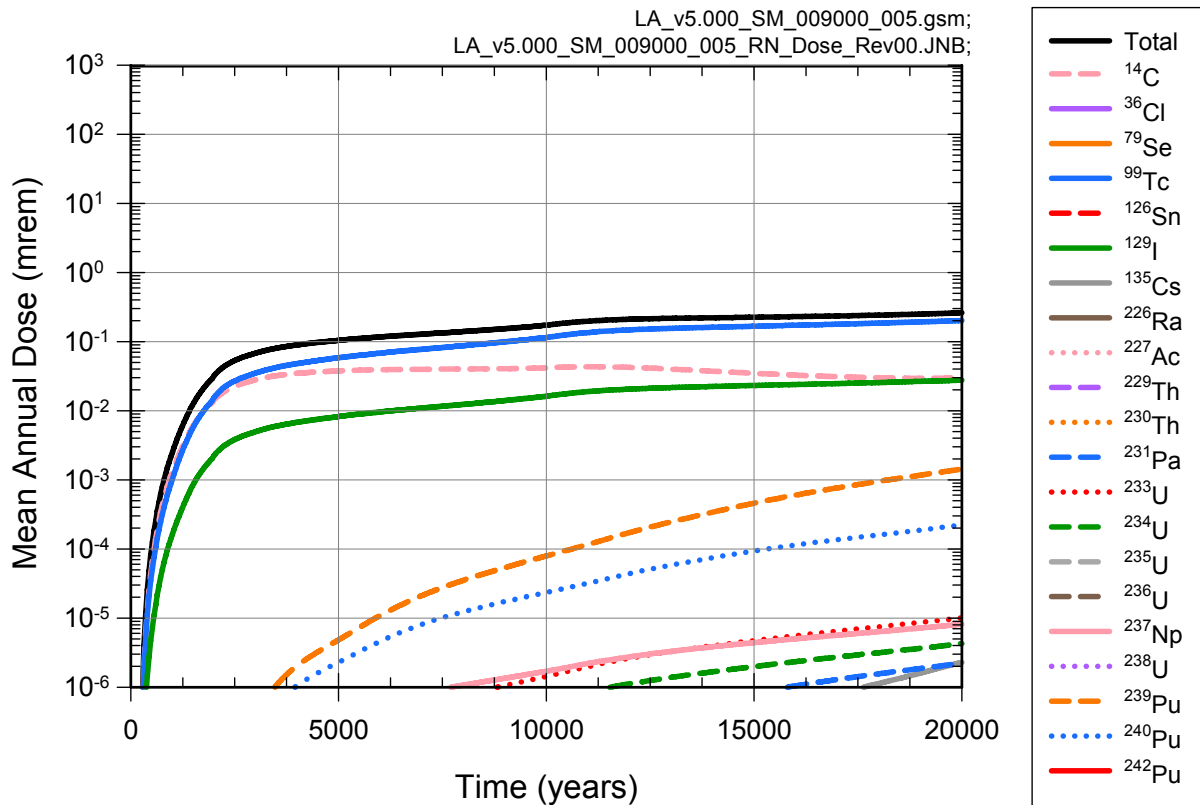
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-6. Summary of results obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when only seismic ground motion events are considered.



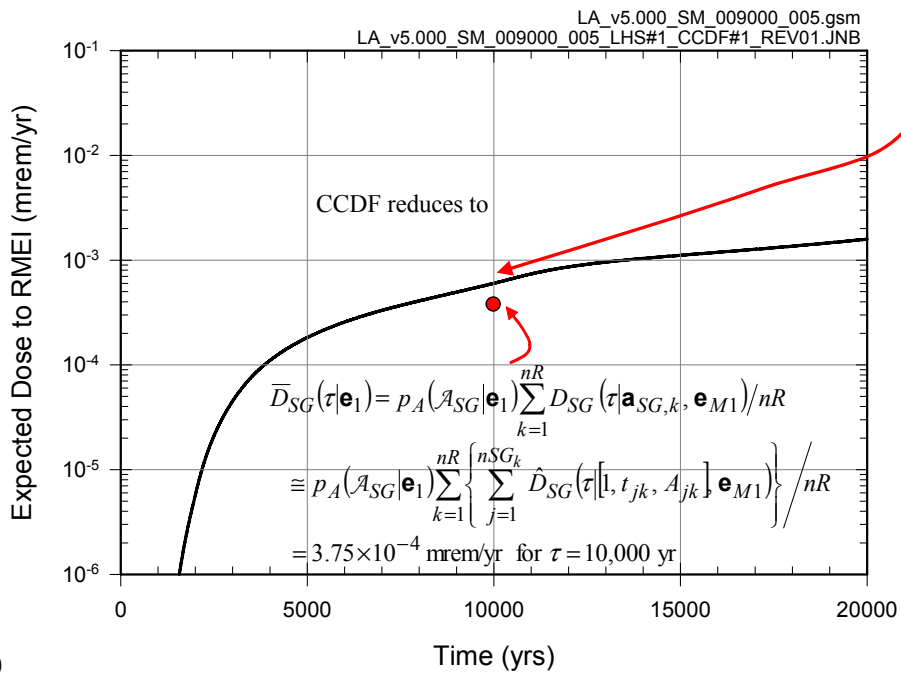
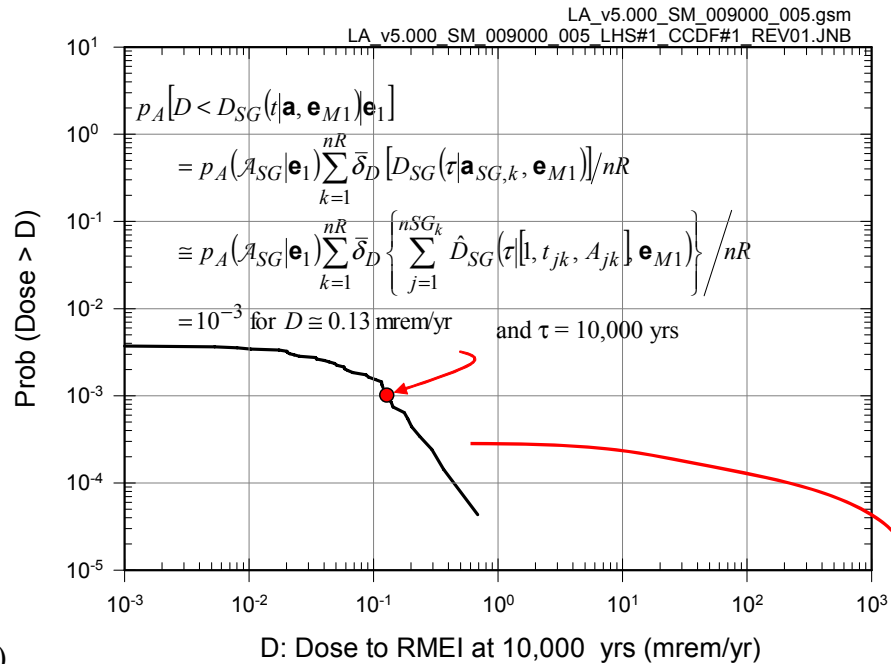
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-7. Estimate obtained with LHS of size $n_{LHS} = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr with r corresponding to ⁹⁹Tc that results when only seismic ground motion events are considered: (a) expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, n_{LHS} = 300$, (b) expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG,r}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SG,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SG,r}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}_{SG,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



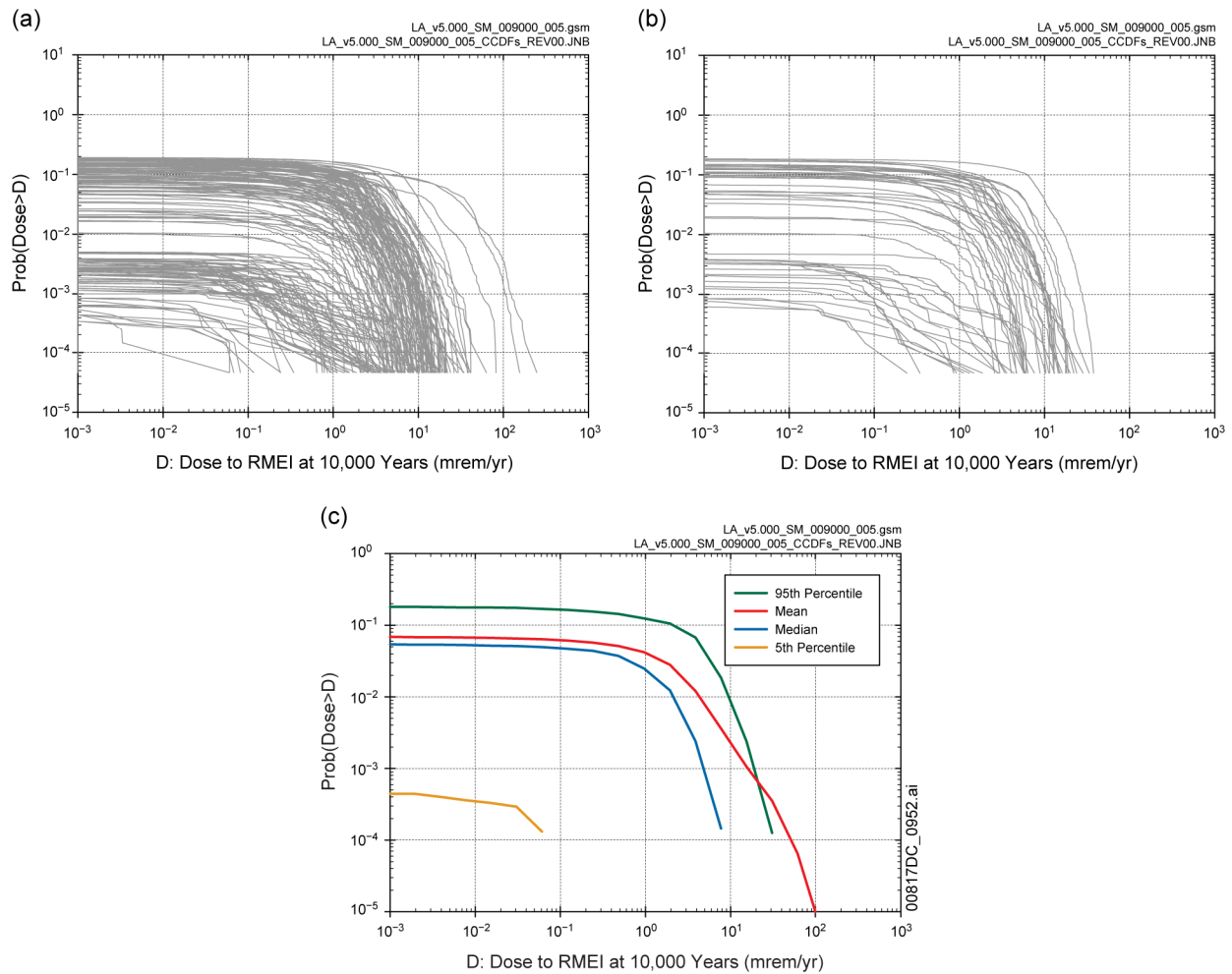
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-8. Estimates obtained with LHS of size $n_{LHS} = 300$ of expected (mean) dose $\bar{D}_{SG,r}(\tau)$ to RMEI for $0 \leq \tau \leq 20,000$ yr for individual radioactive species that result when only seismic ground motion events are considered.



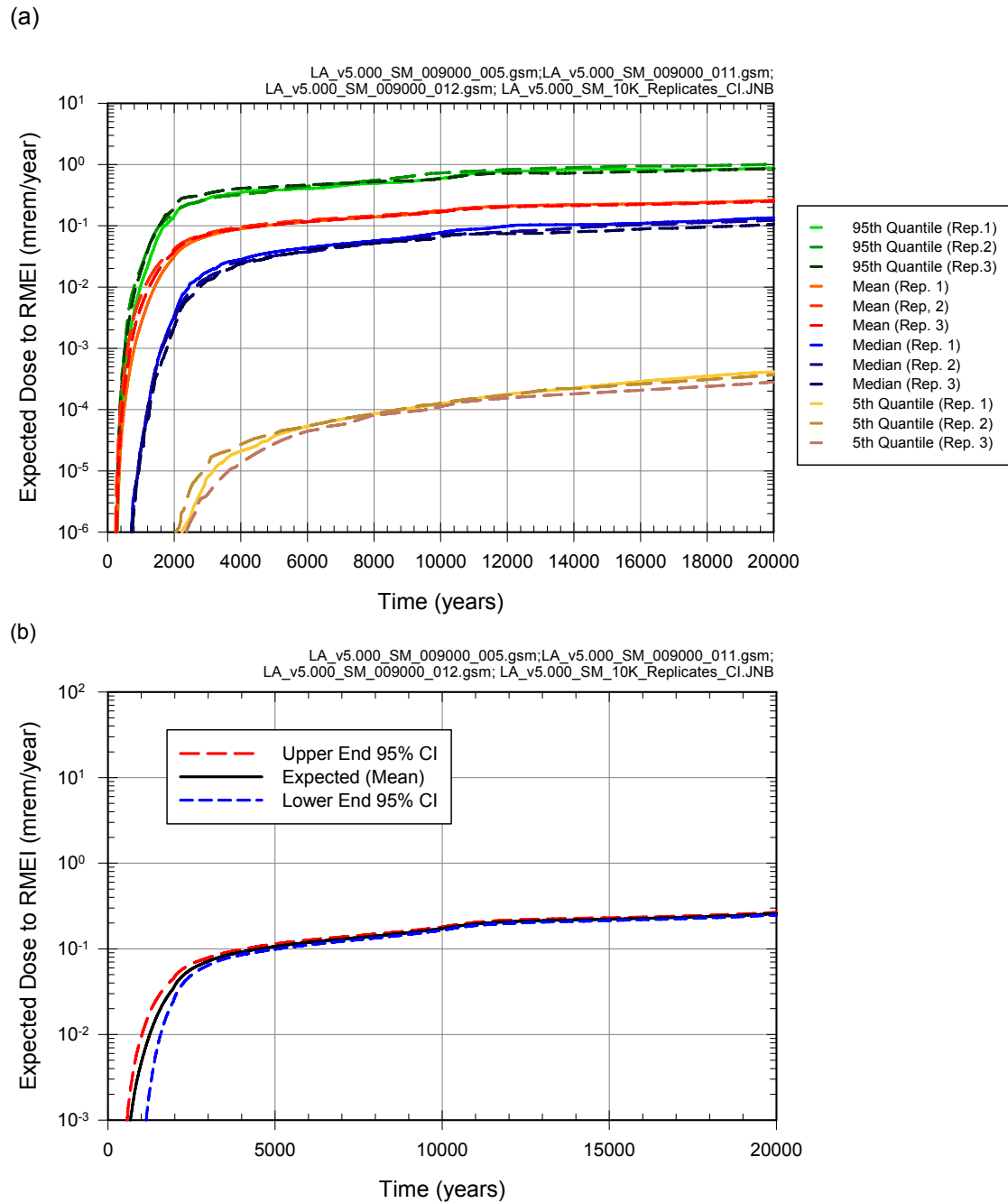
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-9. Results associated with $D_{SG}(\tau|\mathbf{a}_{SG}, \mathbf{e}_{M1})$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ obtained with sampling-based (Monte Carlo) procedures: (a) CCDF for $D_{SG}(10^4 \text{ yr}|\mathbf{a}_{SG}, \mathbf{e}_{M1})$ with exceedance probabilities $p_A[D < D_{SG}(10^4 \text{ yr}|\mathbf{a}, \mathbf{e}_{M1})|\mathbf{e}_1]$ defined in Equation J8.3-22, and (b) expected dose $\bar{D}_{SG}(10^4 \text{ yr}|\mathbf{e}_1)$ associated with $D_{SG}(10^4 \text{ yr}|\mathbf{a}_{SG}, \mathbf{e}_{M1})$ defined in Equation J8.3-20.



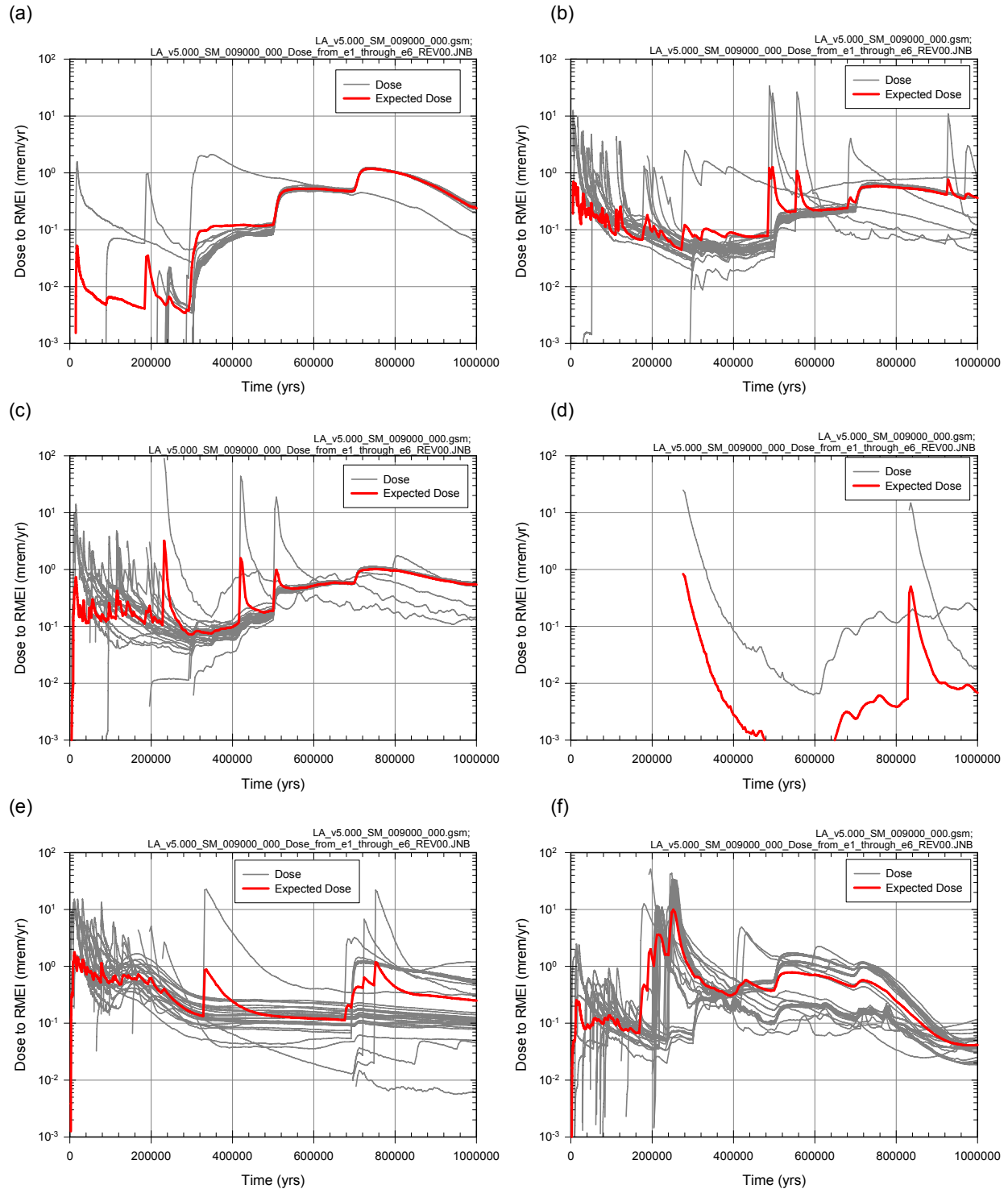
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.3-10. Results associated with $D_{SG}(10^4 \text{ yr} | \mathbf{a}_{SG}, \mathbf{e}_M)$ obtained with sampling-based (Monte Carlo) procedures for an LHS of size $nLHS = 300$: (a) CCDFs for $D_{SG}(10^4 \text{ yr} | \mathbf{a}_{SG}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SG}(10^4 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, nLHS = 300$, (b) CCDFs for $D_{SG}(10^4 \text{ yr} | \mathbf{a}_{SG}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SG}(10^4 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, 50$, and (c) expected (mean) CCDF and quantile curves, $q = 0.05, 0.5, 0.95$, for CCDFs in (a).



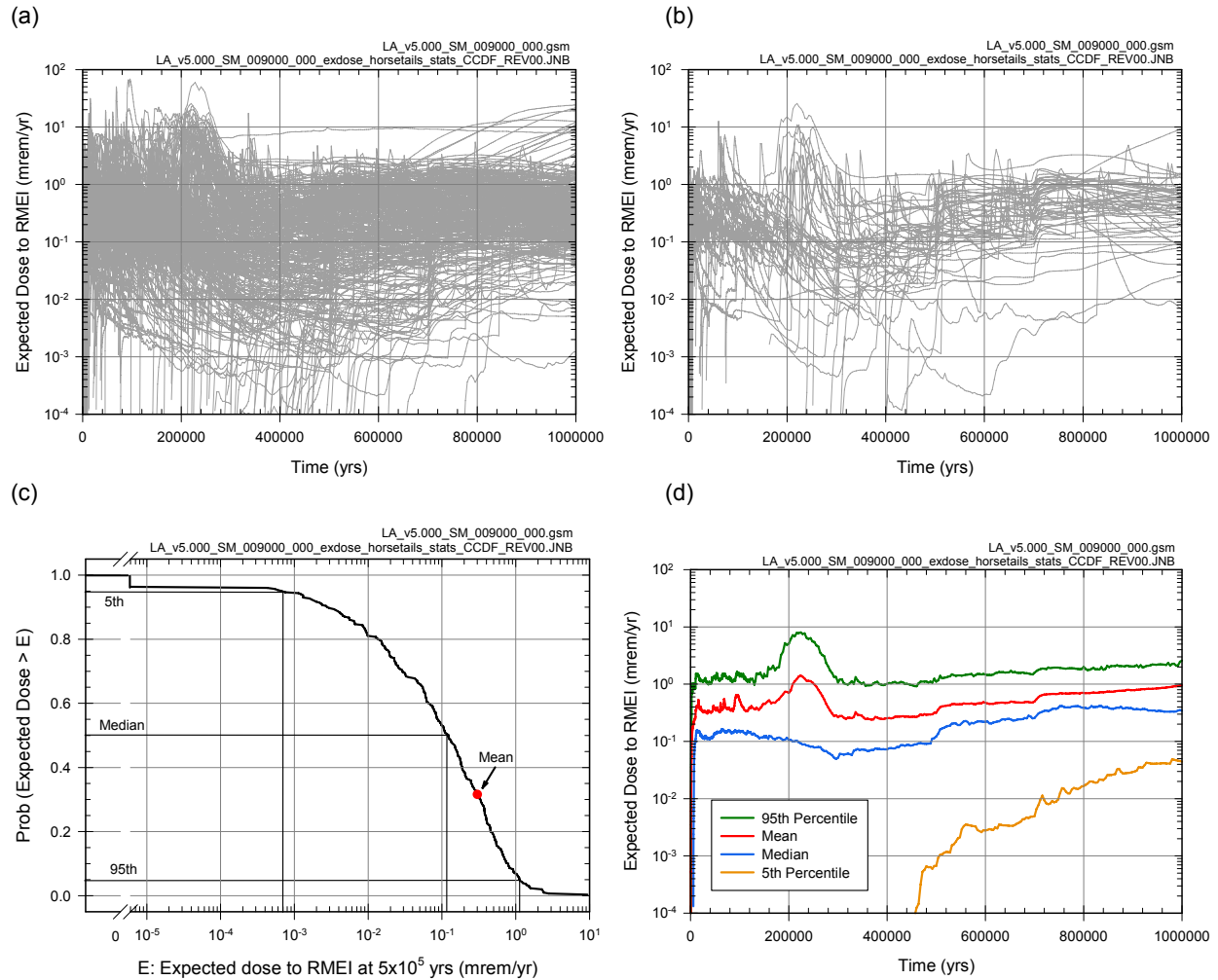
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

Figure J8.3-11. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when only seismic ground motion events are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}_{SG}(\tau)$ and quantiles $Q_q[\bar{D}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}_{SG}(\tau)$.



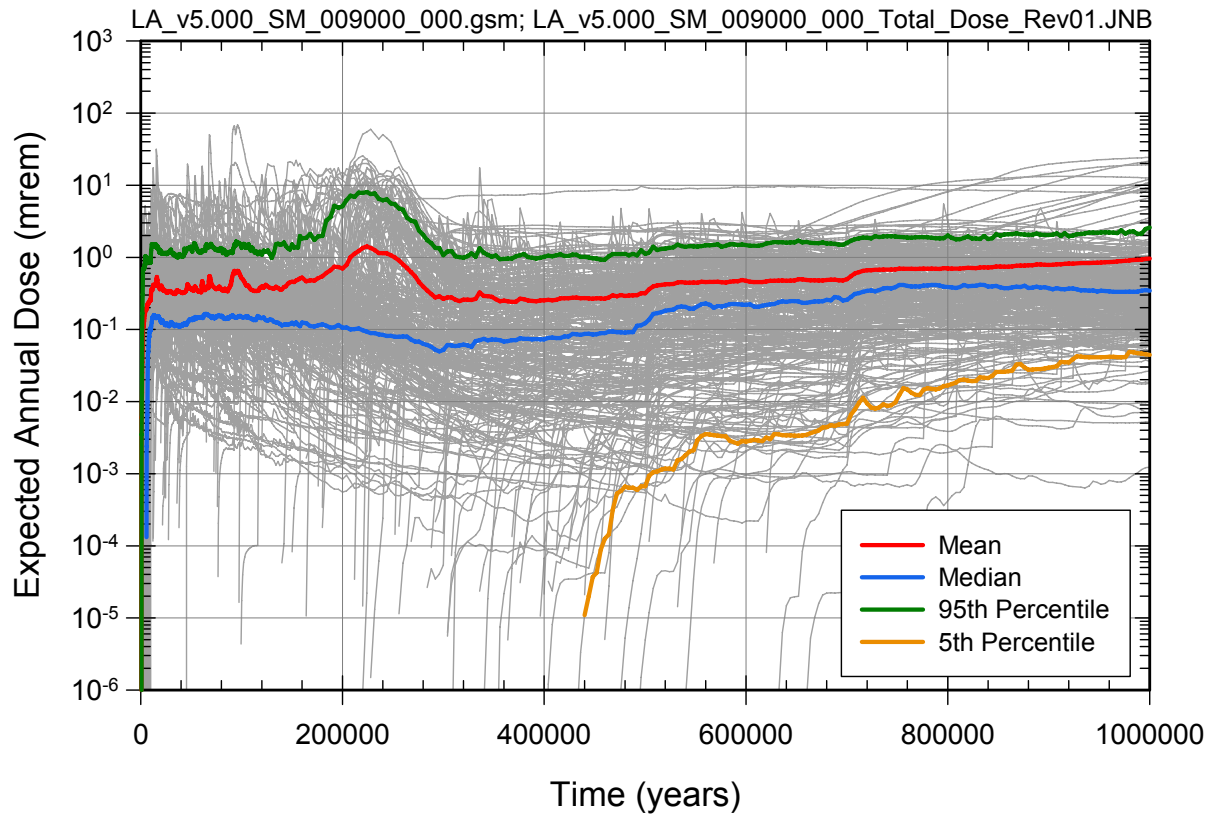
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.4-1. Doses $D_{SG}(\tau|\mathbf{a}_{SG,ik}, \mathbf{e}_{Mi})$, $k = 1, 2, \dots, nR = 30$, and estimated expected doses $\bar{D}_{SG}(\tau|\mathbf{e}_i)$ to the RMEI for $0 \leq \tau \leq 10^6$ yr for selected LHS elements $\mathbf{e}_i = [\mathbf{e}_{Ai}, \mathbf{e}_{Mi}]$ when only nominal processes and seismic ground motion events are considered: (a) \mathbf{e}_1 , (b) \mathbf{e}_2 , (c) \mathbf{e}_3 , (d) \mathbf{e}_4 , (e) \mathbf{e}_5 , and (f) \mathbf{e}_6 .



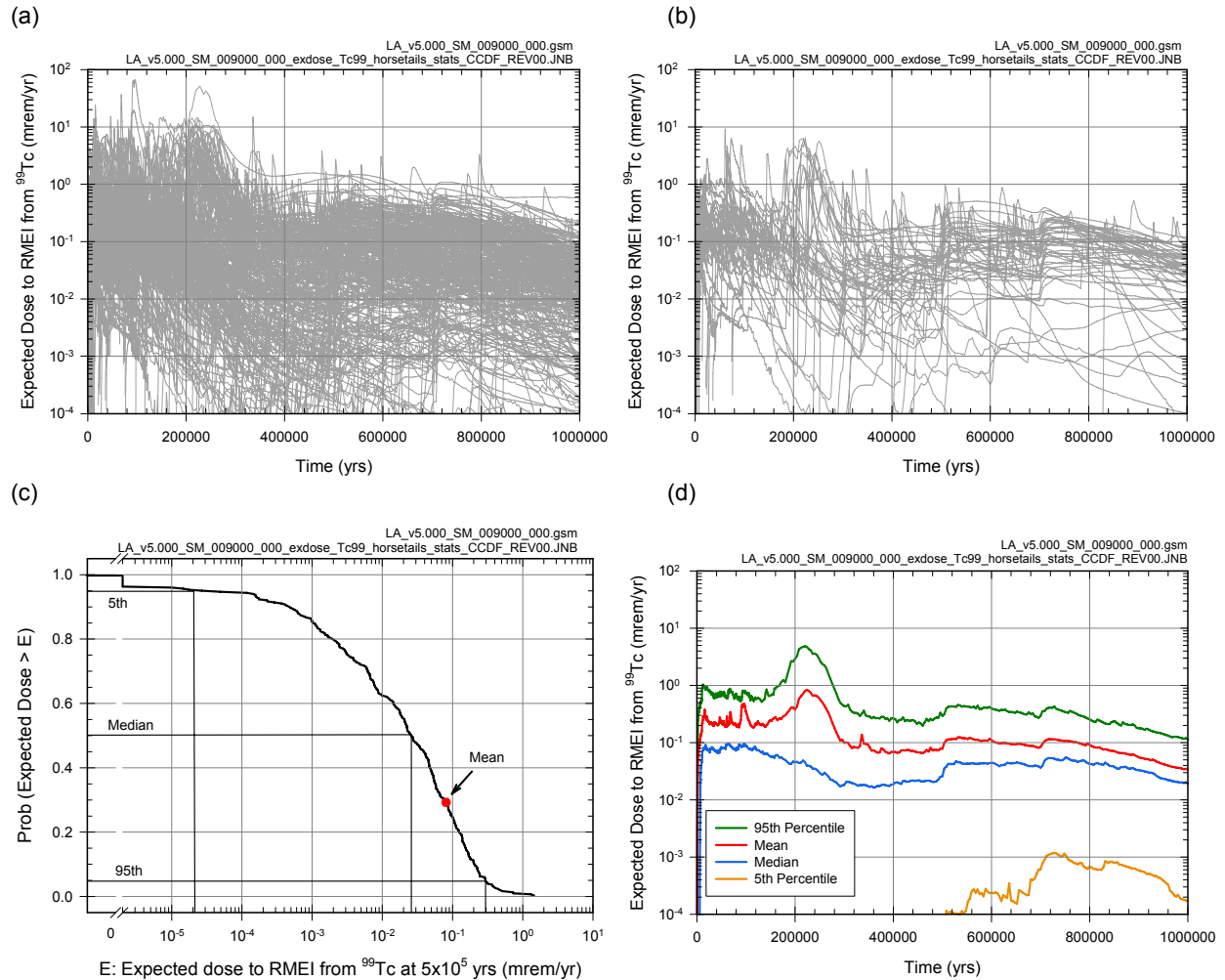
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.4-2. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr that results when only nominal processes and seismic ground events are considered: (a) expected dose $\bar{D}_{SG}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SG}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 500,000$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SG}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



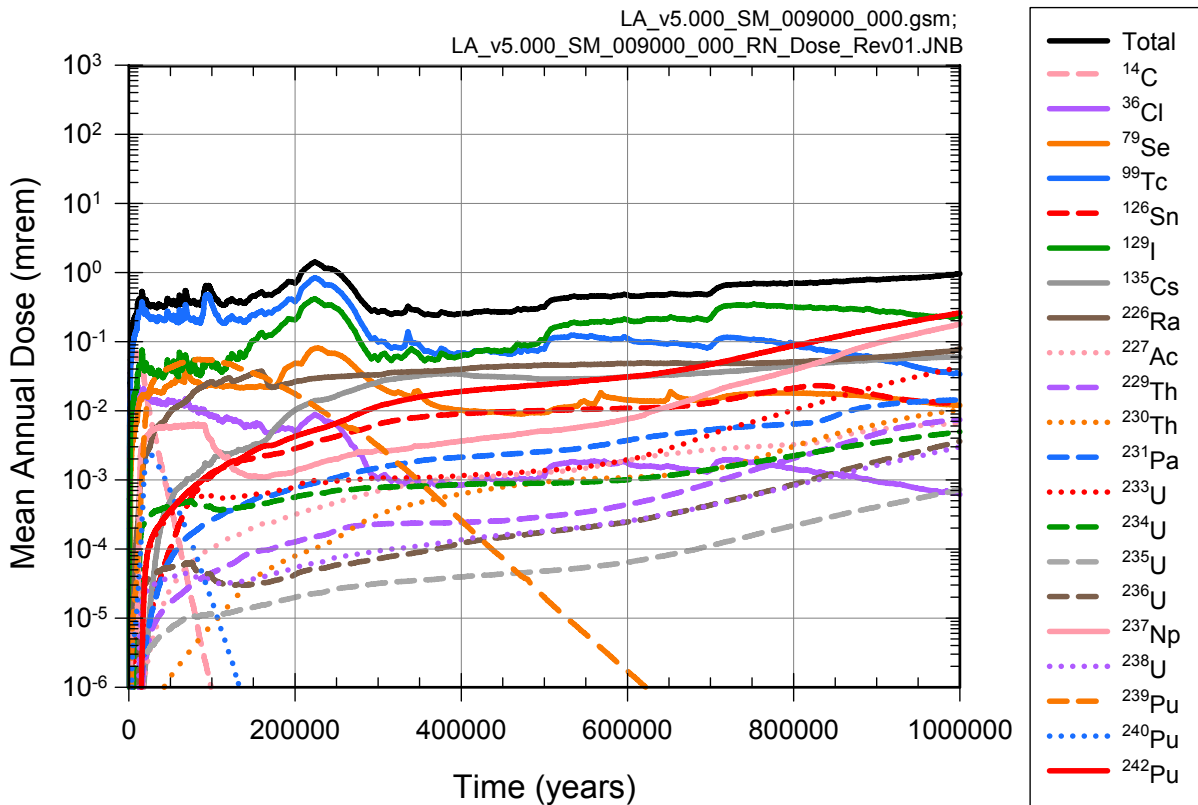
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.4-3. Summary of results obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|e)$ to RMEI for $0 \leq \tau \leq 10^6$ yr that results when only nominal processes and seismic ground events are considered.



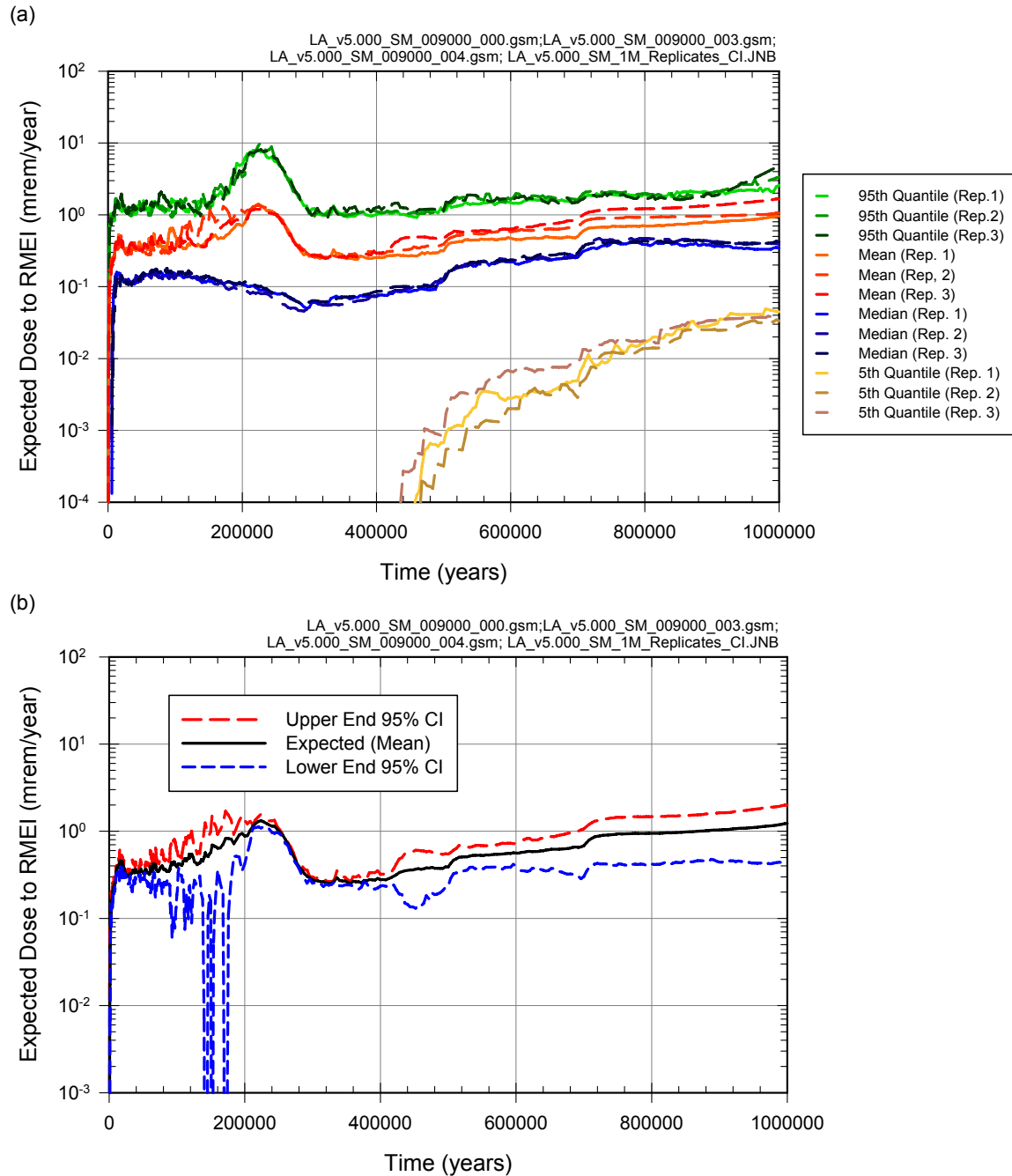
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.4-4. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr with r corresponding to ⁹⁹Tc that results when only nominal processes and seismic ground events are considered: (a) expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SG,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG,r}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SG,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 500,000$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SG,r}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}_{SG,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



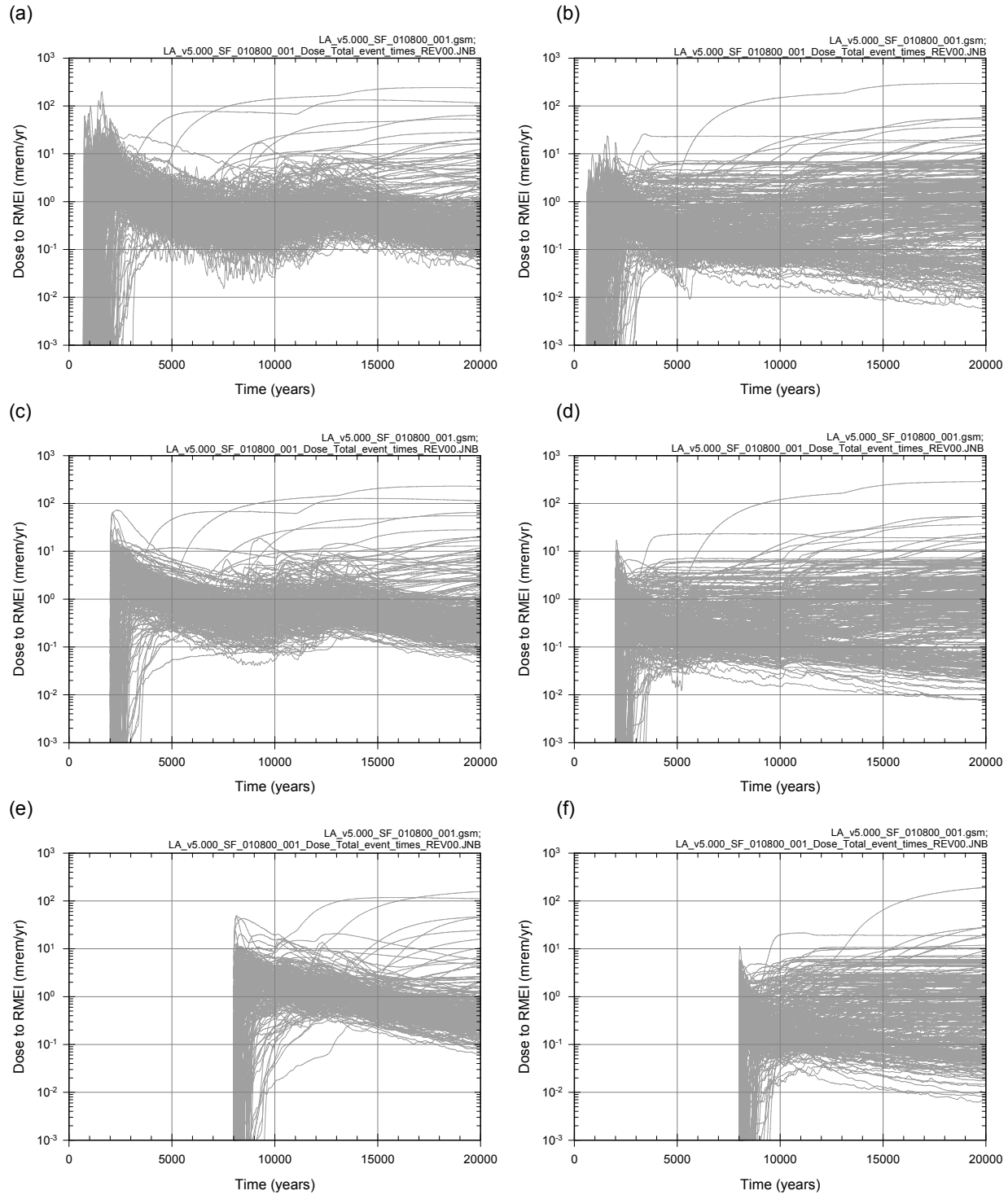
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.4-5. Estimates obtained with LHS of size $n_{LHS} = 300$ of expected (mean) dose $\bar{D}_{SG,r}(\tau)$ to RMEI for $0 \leq \tau \leq 10^6$ yr for individual radioactive species that result when only nominal proceses and seismic ground events are considered.



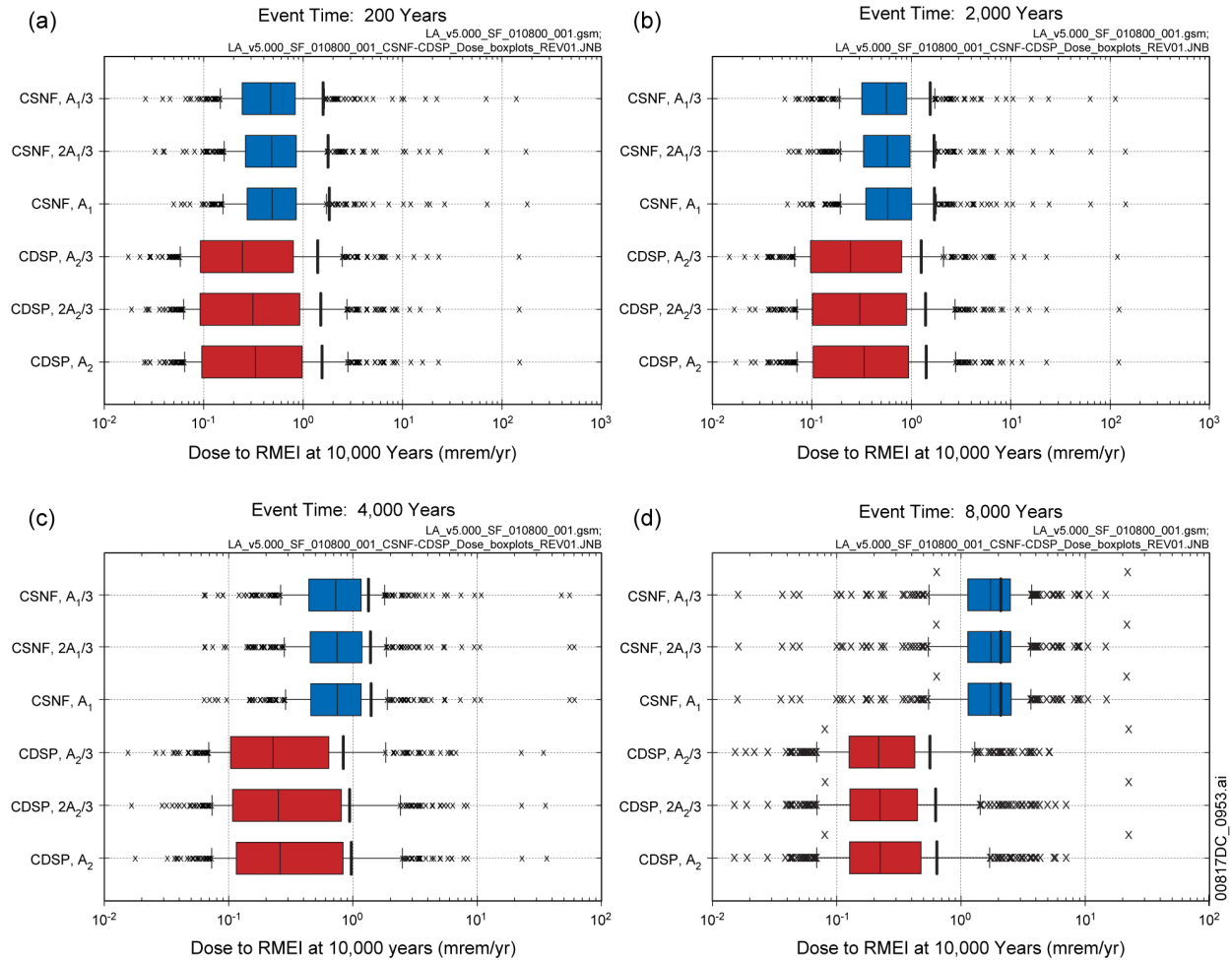
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

Figure J8.4-6. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}_{SG}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr that results when only nominal processes and seismic ground motion events are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}_{SG}(\tau)$ and quantiles $Q_q[\bar{D}_{SG}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}_{SG}(\tau)$.



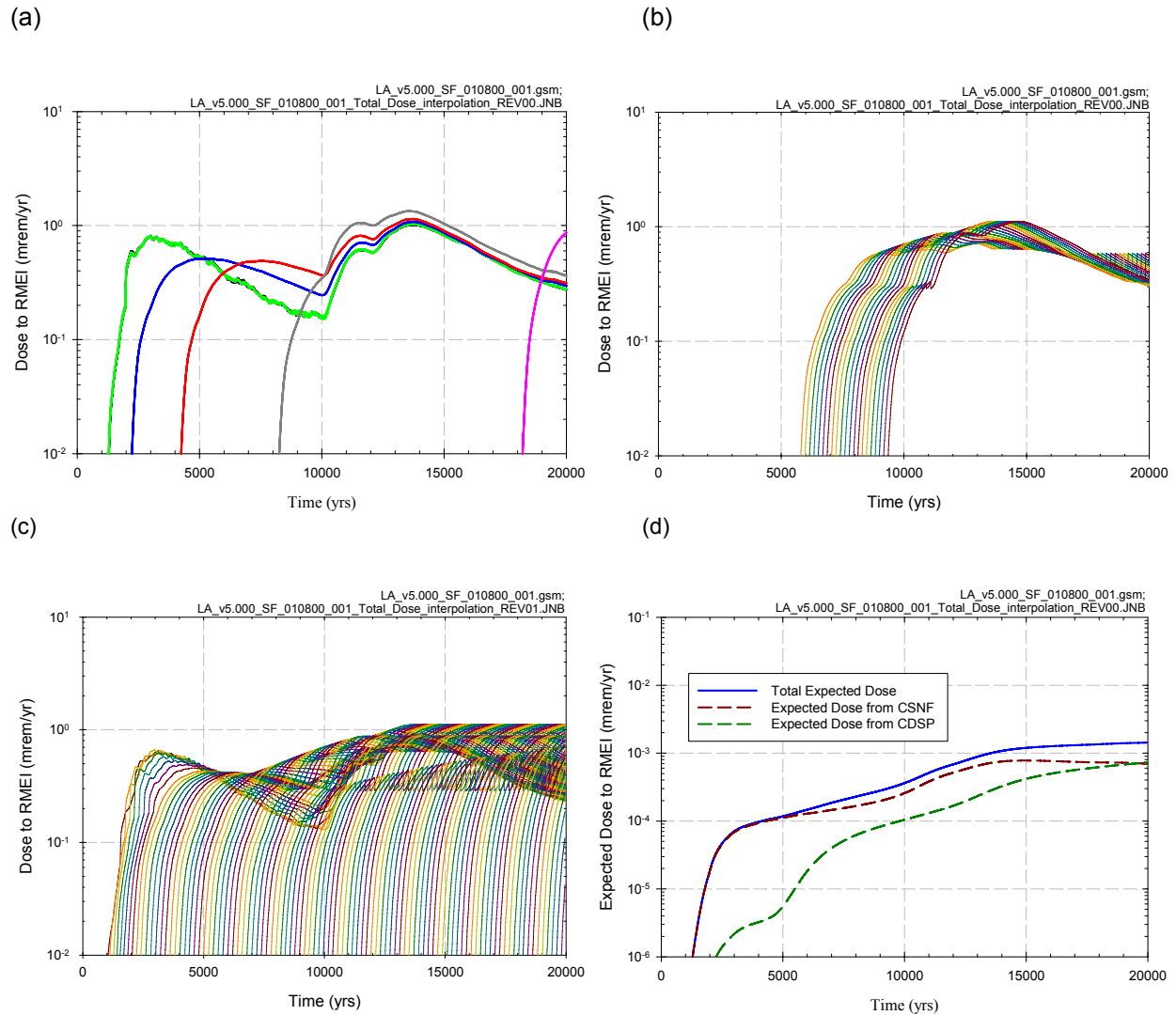
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-1. Summary of results for fault displacement damage of CSNF and CDSP WPs obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in doses $D_{SF,r}[\tau][1, t_j, 100, A_r/3, \sim][e_{Mi}]$ for $0 \leq \tau \leq 20,000$ yr, $r = 1, 2$, with $1 \sim$ CSNF WPs and $r = 2 \sim$ CDSP WPs, $A_1 = 2.78 \text{ m}^2$ and $A_2 = 3.28 \text{ m}^2$, and $i = 1, 2, \dots, nLHS = 300$: (a, c, e) CSNF WPs for $t_j = 200, 2000$ and 8000 yrs and (b, d, f) CDSP WPs for $t_j = 200, 2000$ and 8000 yrs.



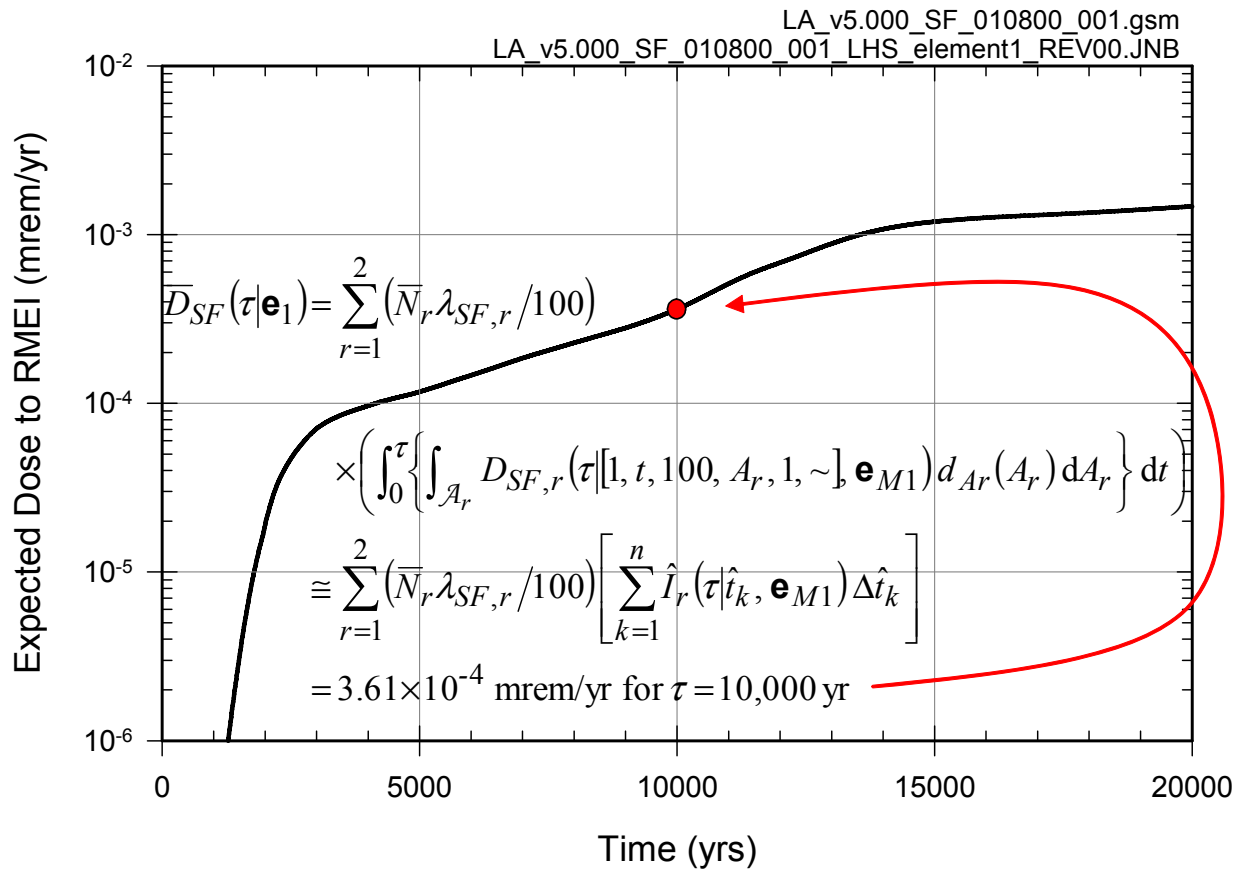
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-2. Box plots (see Figure J6.2-3 for description) summarizing results for fault displacement damage to CSNF and CDSP WPs obtained with LHS of size $nLHS = 300$ showing epis-temic uncertainty in dose $D_{SF,r}(10^4 \text{ yr}[1, t_j, 100, A_{rk}, \sim]e_{Mi})$ for $t_j = 200, 2000, 4000$ and 8000 yrs, $r = 1, 2$, with $1 \sim$ CSNF WPs and $r = 2 \sim$ CDSP WPs, $A_{rk} = A_r/3, 2A_r/3, A_r$, with $A_1 = 2.78 \text{ m}^2$ and $A_2 = 3.28 \text{ m}^2$, and $i = 1, 2, \dots, nLHS = 300$: (a) $t_j = 200$ yr, (b) $t_j = 2000$ yr, (c) $t_j = 4000$ yr, and (d) $t_j = 8000$ yr.



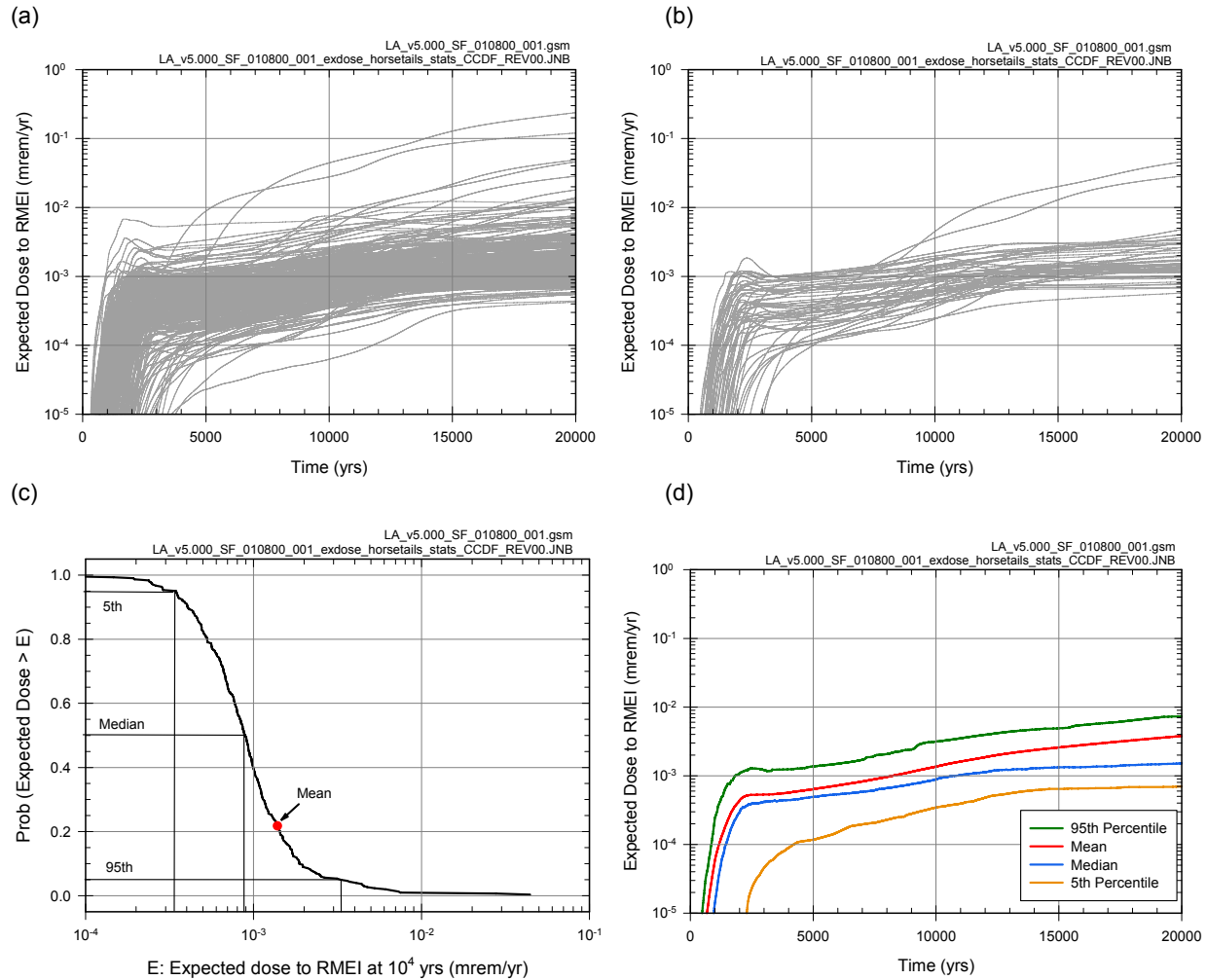
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-3. Illustration of interpolation procedure to estimate integrals $\hat{I}_r(\tau|t, \mathbf{e}_{Mi})$ and expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$ from calculated doses $D_{SF,r}(\tau|[1, t_j, 100, A_{rk}, 1, \sim], \mathbf{e}_{Mi})$ in Equation J8.6-18 for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and the time interval $[0, 2.0 \times 10^4 \text{ yr}]$: (a) $D_{SF,1}(\tau|[1, t_j, 100, A_{rk}, 1, \sim], \mathbf{e}_{M1})$ for $j = 1, 2, \dots, 6$ and $k = 1, 2, 3$ (Notes: Results overlay for A_{1k} , $k = 1, 2, 3$, for each t_j , and results for t_1 and t_2 also overlay), (b) Interpolated values $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_{M1})$ for \hat{t}_k between $t_4 = 4000 \text{ yr}$ and $t_5 = 8000 \text{ yr}$, (c) Interpolated values for $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_{M1})$ for \hat{t}_k between 200 and 20,000 yr, and (d) estimates for $\bar{D}_{SF,1}(\tau|\mathbf{e}_i)$ for CSNF WPs, $\bar{D}_{SF,2}(\tau|\mathbf{e}_i)$ for CDSP WPs and $\bar{D}_{SF}(\tau|\mathbf{e}_i)$ for CSNF and CDSP WPs.



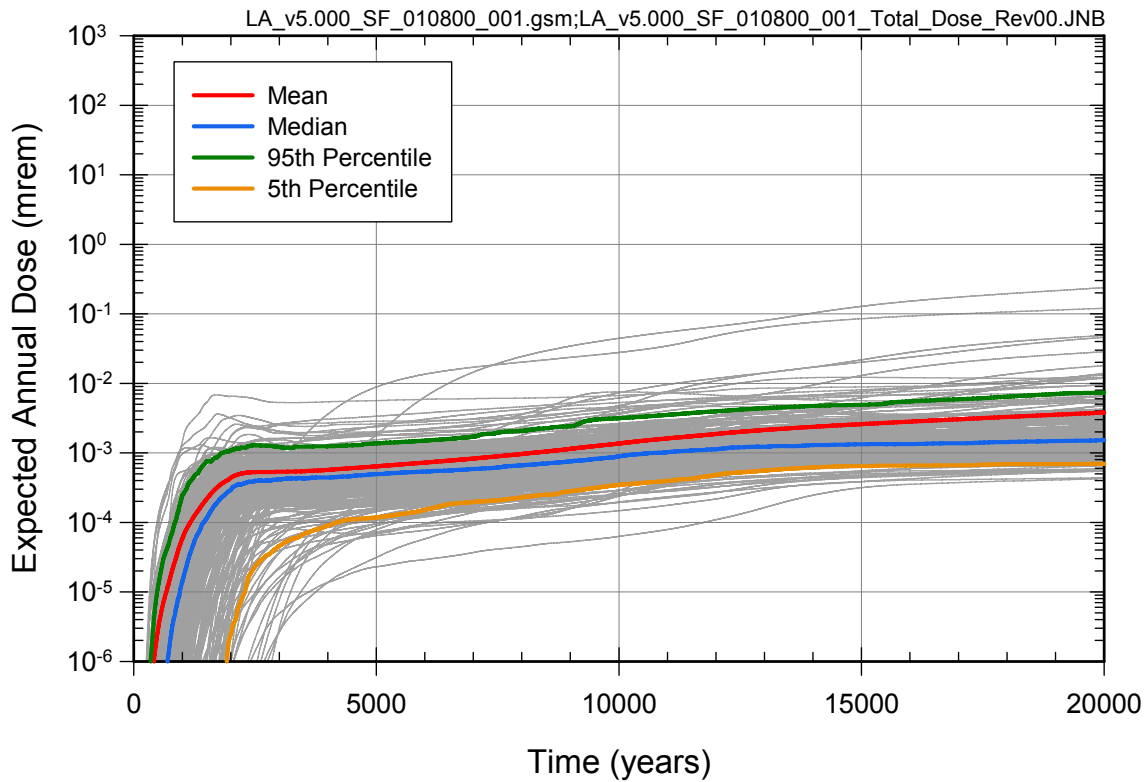
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-4. Estimate of $\bar{D}_{SF}(\tau|\mathbf{e}_1)$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and $0 \leq \tau \leq 20,000$ yr with integration-based procedure indicated in Equations J8.6-17 and J8.6-25.



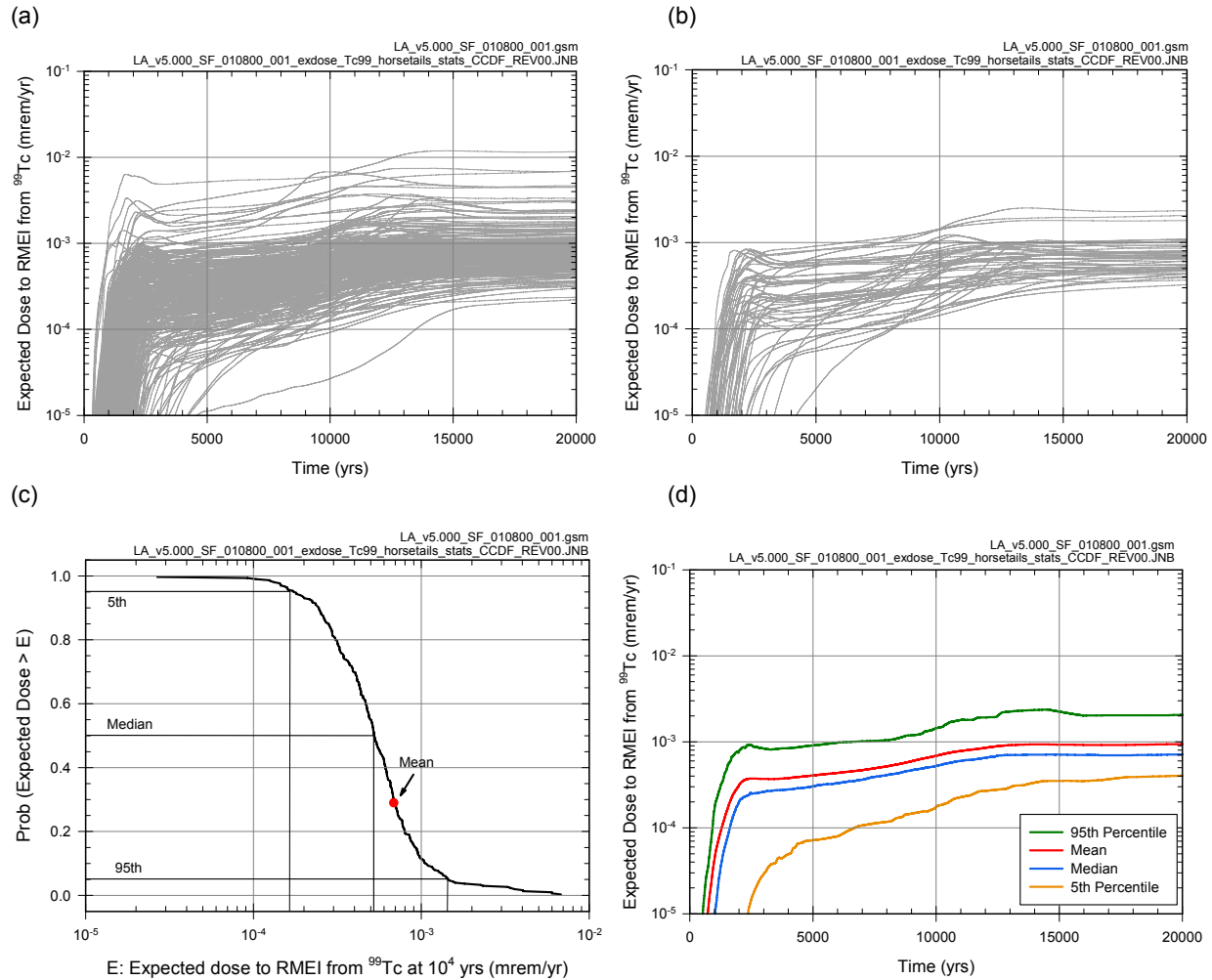
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-5. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that at results when only fault displacement events are considered: (a) expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $\rho_E[D < \bar{D}_{SG}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{D}_{SF}(\tau)$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



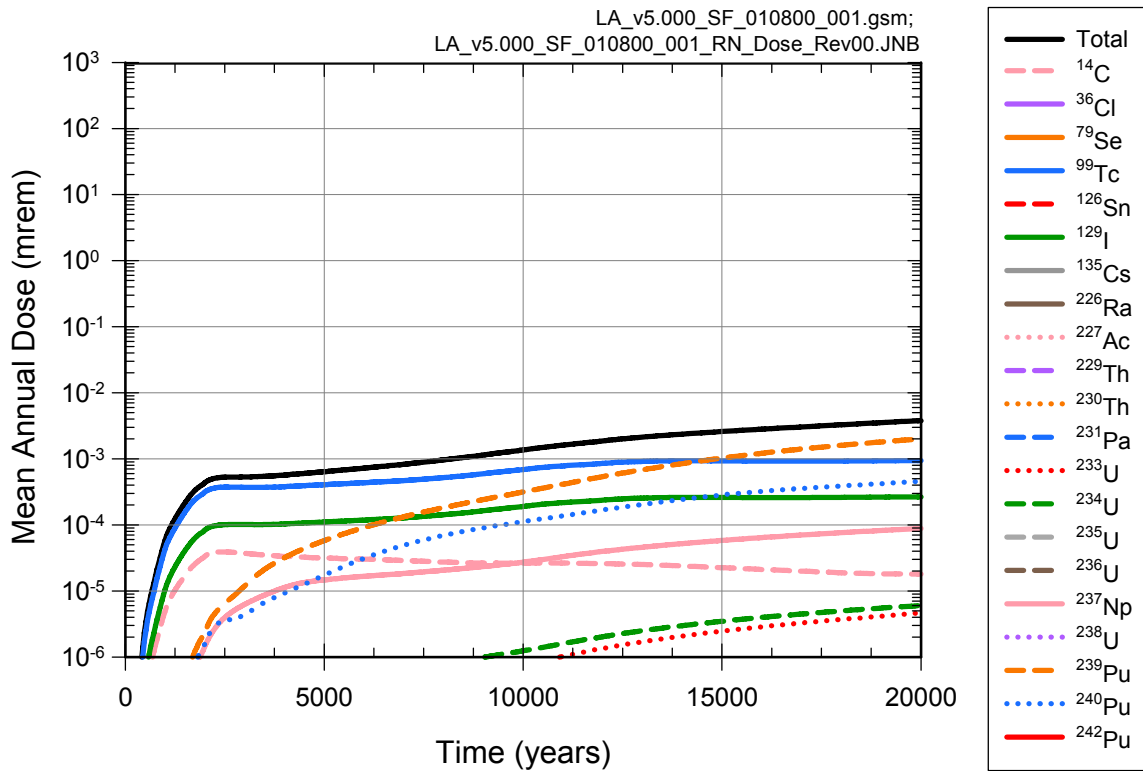
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-6. Summary of results obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when only fault displacement events are considered.



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

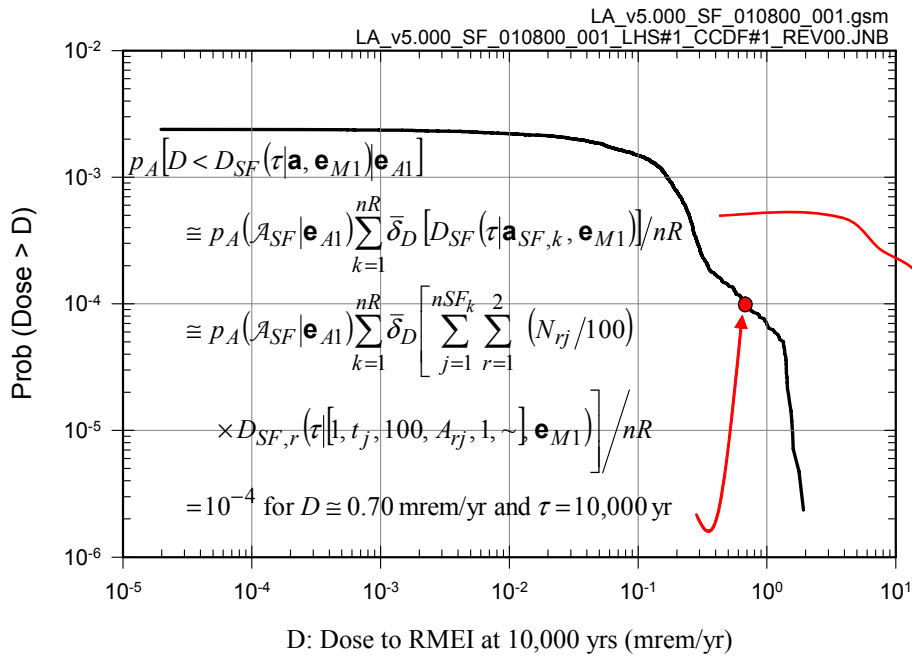
Figure J8.6-7. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr with r corresponding to ^{99}Tc that results when only fault displacement events are considered: (a) expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG,r}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SF,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SF,r}(\tau)$ and quantiles $Q_q[\bar{D}_{SF,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



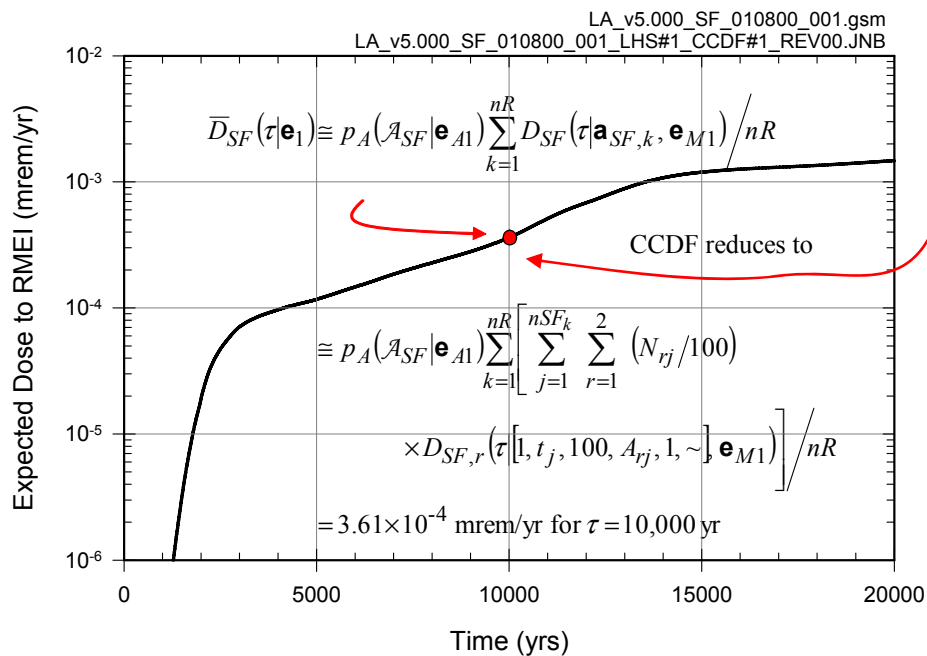
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-8. Estimates obtained with LHS of size $nLHS = 300$ of expected (mean) dose $\bar{D}_{SF,r}(\tau)$ to RMEI for $0 \leq \tau \leq 20,000$ yr for individual radioactive species that result when only seismic ground motion events are considered.

(a)

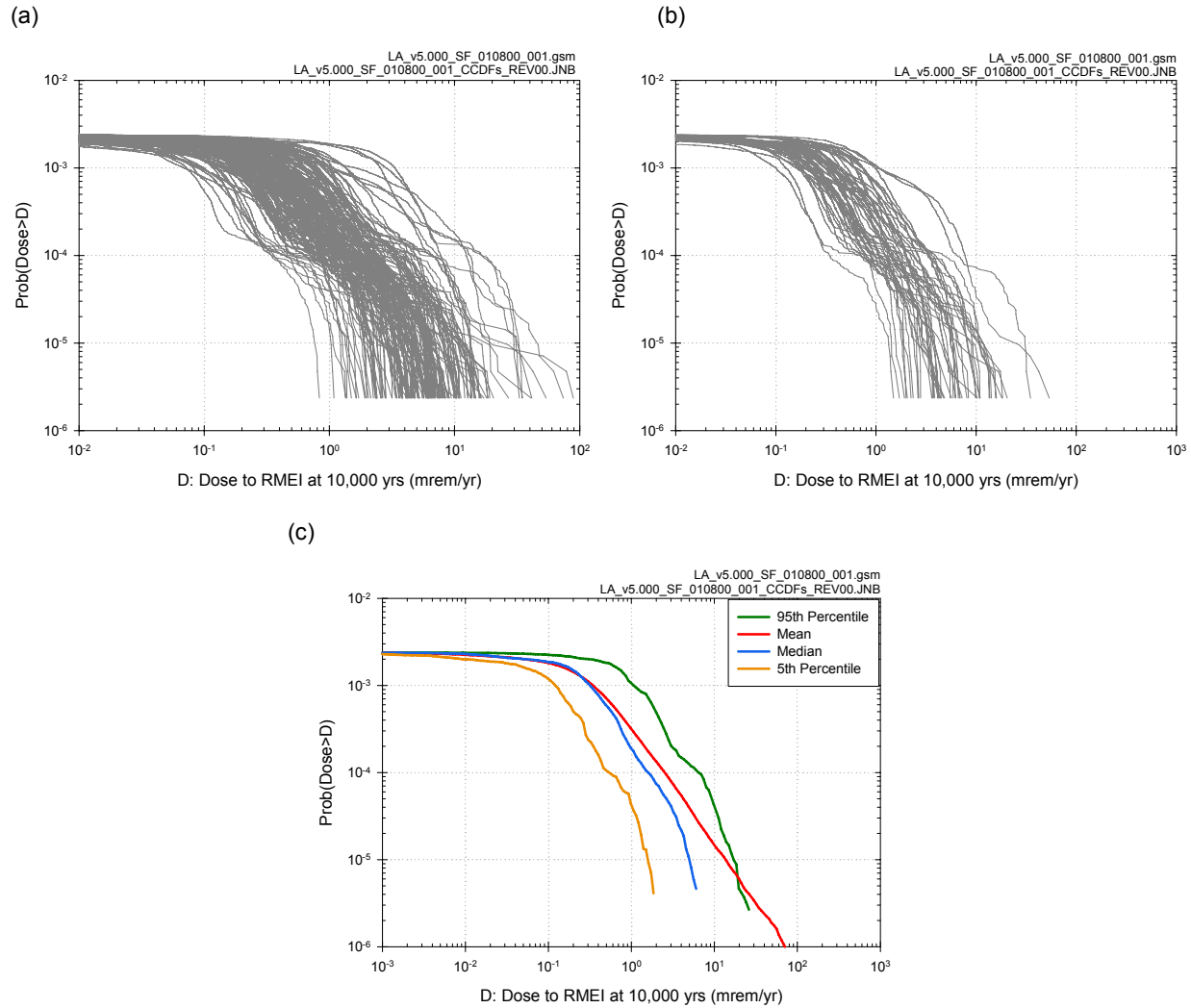


(b)



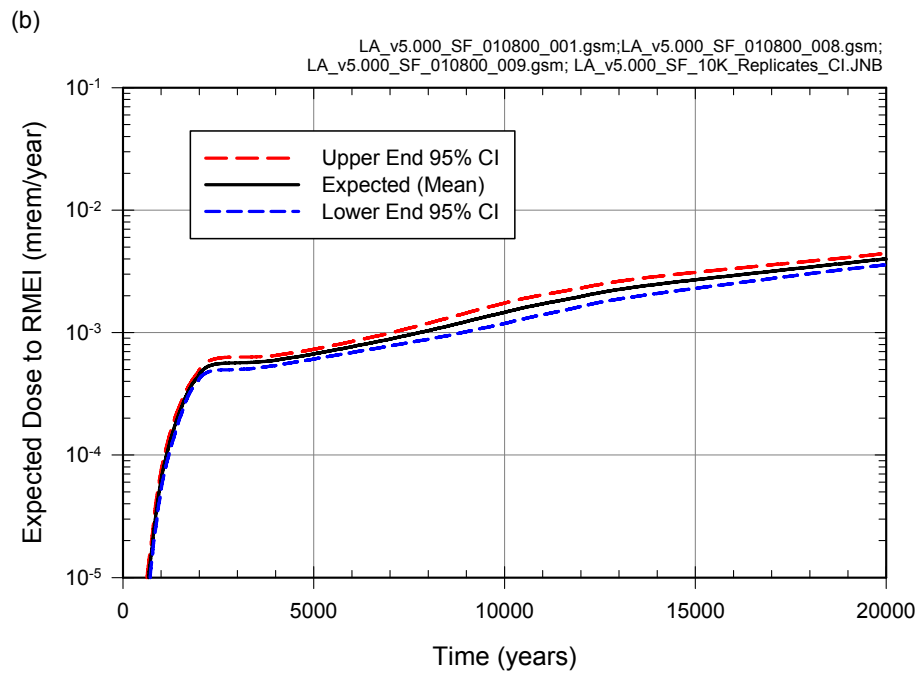
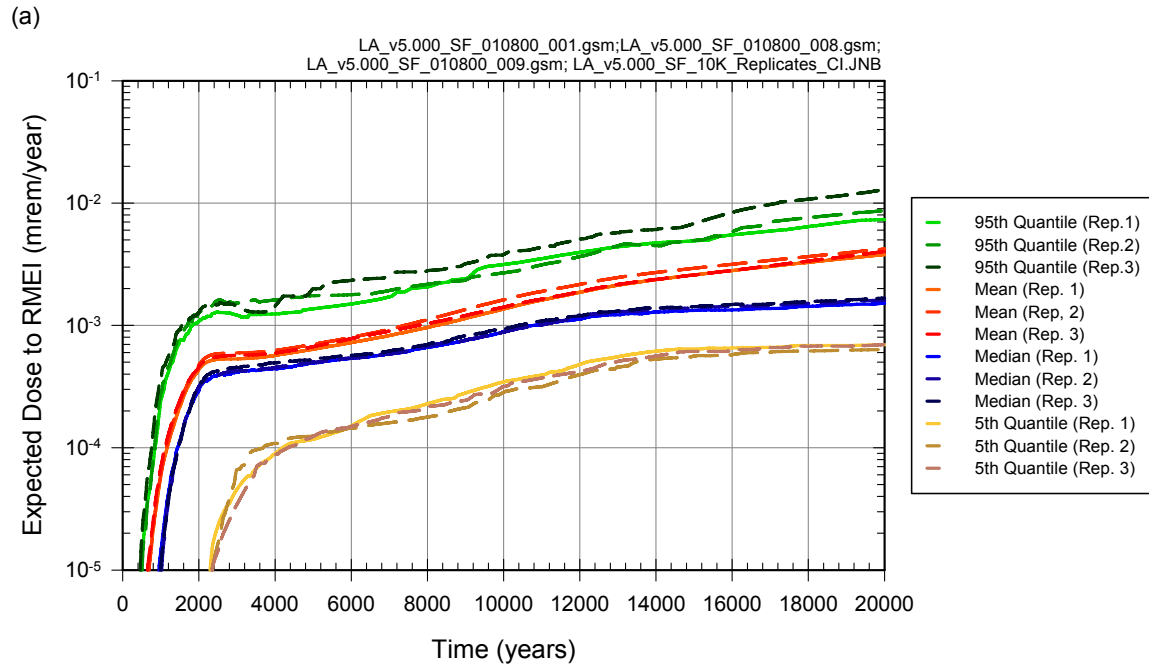
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-9. Results associated with $D_{SF}(\tau|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ obtained with sampling-based (Monte Carlo) procedures: (a) CCDF for $D_{SF}(10^4 \text{ yr}|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ with exceedance probabilities $p_A[D < D_{SF}(10^4 \text{ yr}|\mathbf{a}, \mathbf{e}_{M1})|\mathbf{e}_{A1}]$ defined in Equations J4.5-19 and J8.6-36, and (b) expected dose $\bar{D}_{SF}(10^4 \text{ yr}|\mathbf{e}_1)$ associated with $D_{SF}(10^4|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ as defined in Equation J4.5-20.



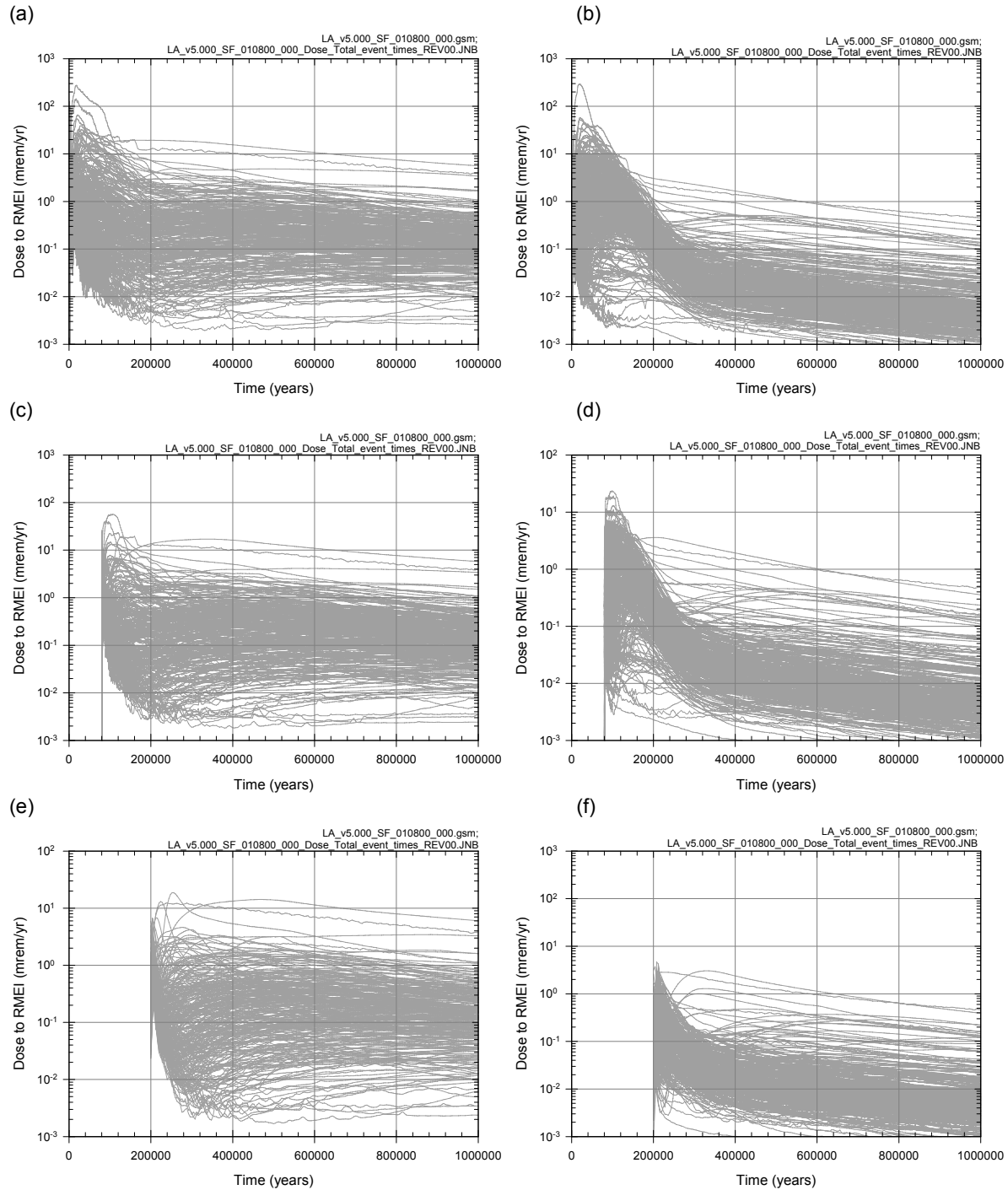
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-10. Results associated with $D_{SF}(10^4 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_M)$ obtained with sampling-based (Monte Carlo) procedures for an LHS of size $n_{LHS} = 300$: (a) CCDFs for $D_{SF}(10^4 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SF}(10^4 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, n_{LHS} = 300$, (b) CCDFs for $D_{SF}(10^4 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SF}(10^4 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, 50$, and (c) expected (mean) CCDF and quantile curves, $q = 0.05, 0.5, 0.95$, for CCDFs in (a).



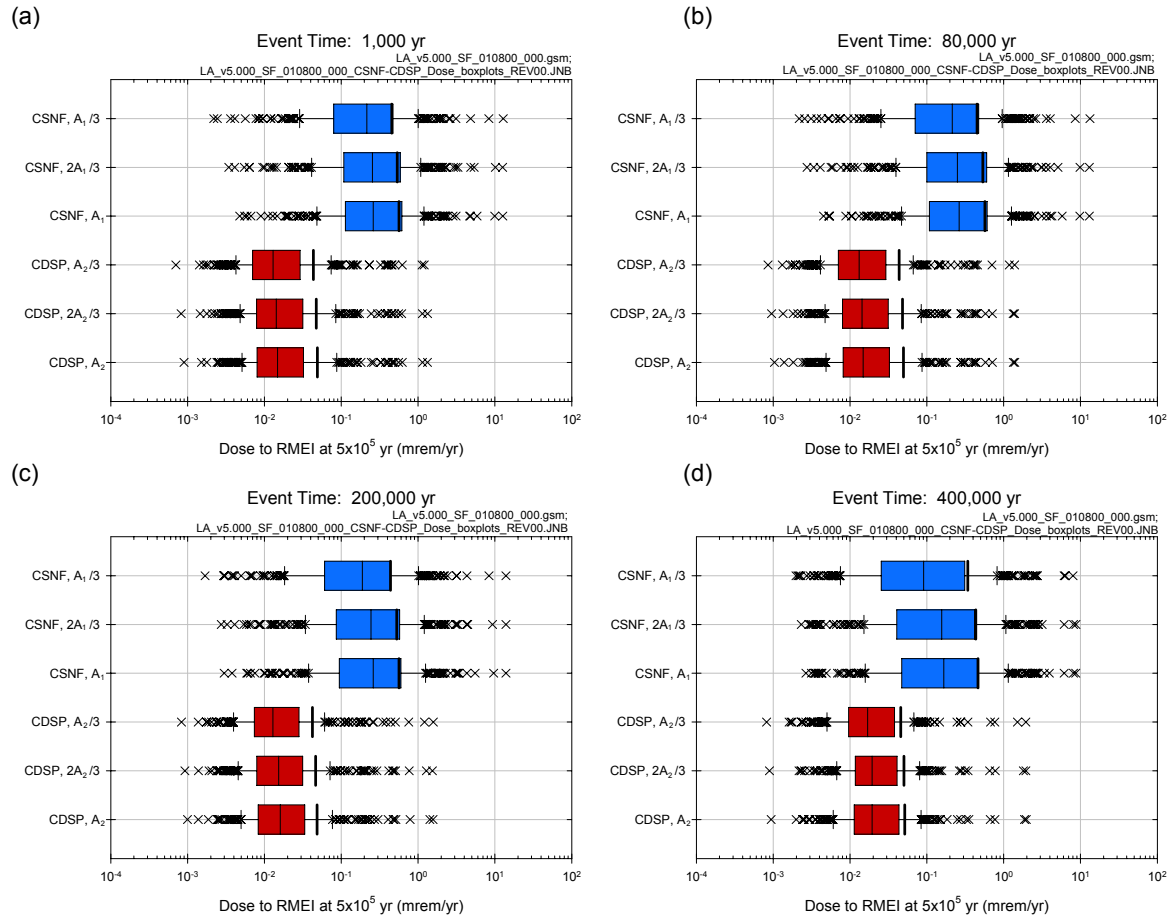
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

Figure J8.6-11. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when only seismic ground motion events are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}_{SF}(\tau)$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}_{SF}(\tau)$.



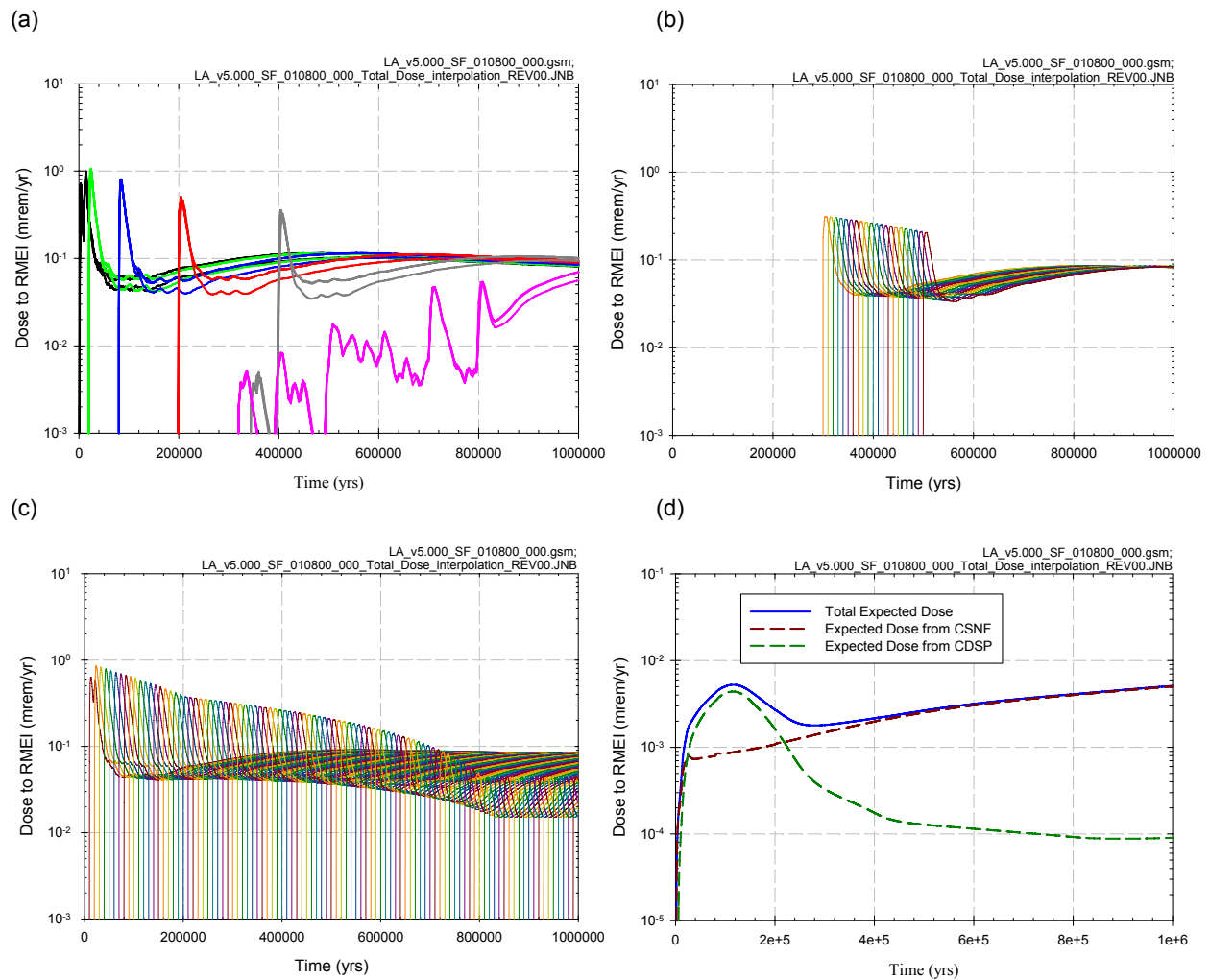
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-12. Summary of results for fault displacement damage of CSNF and CDSP WPs obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in doses $D_{SF,r}(\tau|[1, t_j, 100, A_1/3, \sim], \mathbf{e}_{M_i})$ for $0 \leq \tau \leq 20,000$ yr, $r = 1, 2$, with $r = 1 \sim$ CSNF WPs and $r = 2 \sim$ CDSP WPs, $A_1 = 2.78$ m² and $A_2 = 3.28$ m² and $i = 1, 2, \dots, nLHS = 300$: (a, c, e) CSNF WPs for $t_j = 1000, 80,000$ and $200,000$ yrs and (b, d, f) CDSP WPs for $t_j = 1000, 80,000$ and $200,000$ yrs.



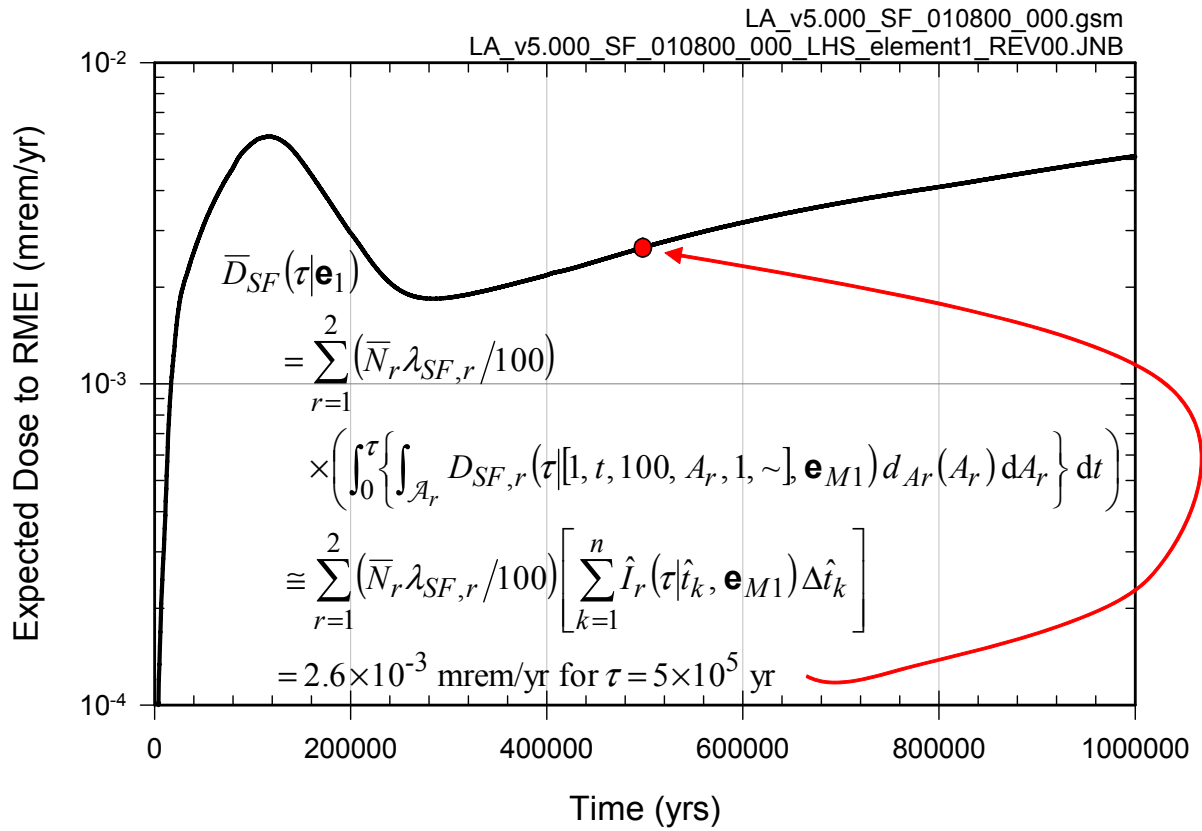
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-13. Box plots (see Figure J6.2-3 for description) summarizing results for fault displacement damage to CSNF and CDSP WPs obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in dose $D_{SF,r}(10^4 \text{ yr})[[1, t_j, 100, A_{rk}, \sim], e_{Mi}]$ for $t_j = 1000, 80,000, 200,000$ and $400,000$ yrs, $r = 1, 2$ with $r = 1 \sim$ CSNF WPs and $r = 2 \sim$ CDSP WPs, $A_{rk} = A_r/3, 2A_r/3, A_r$, with $A_1 = 2.78 \text{ m}^2$ $A_2 = 3.28 \text{ m}^2$, and $i = 1, 2, \dots, nLHS = 300$: (a) $t_j = 1000$ yr, (b) $t_j = 80,000$ yr, (c) $t_j = 200,000$ yr, and (d) $t_j = 400,000$ yr.



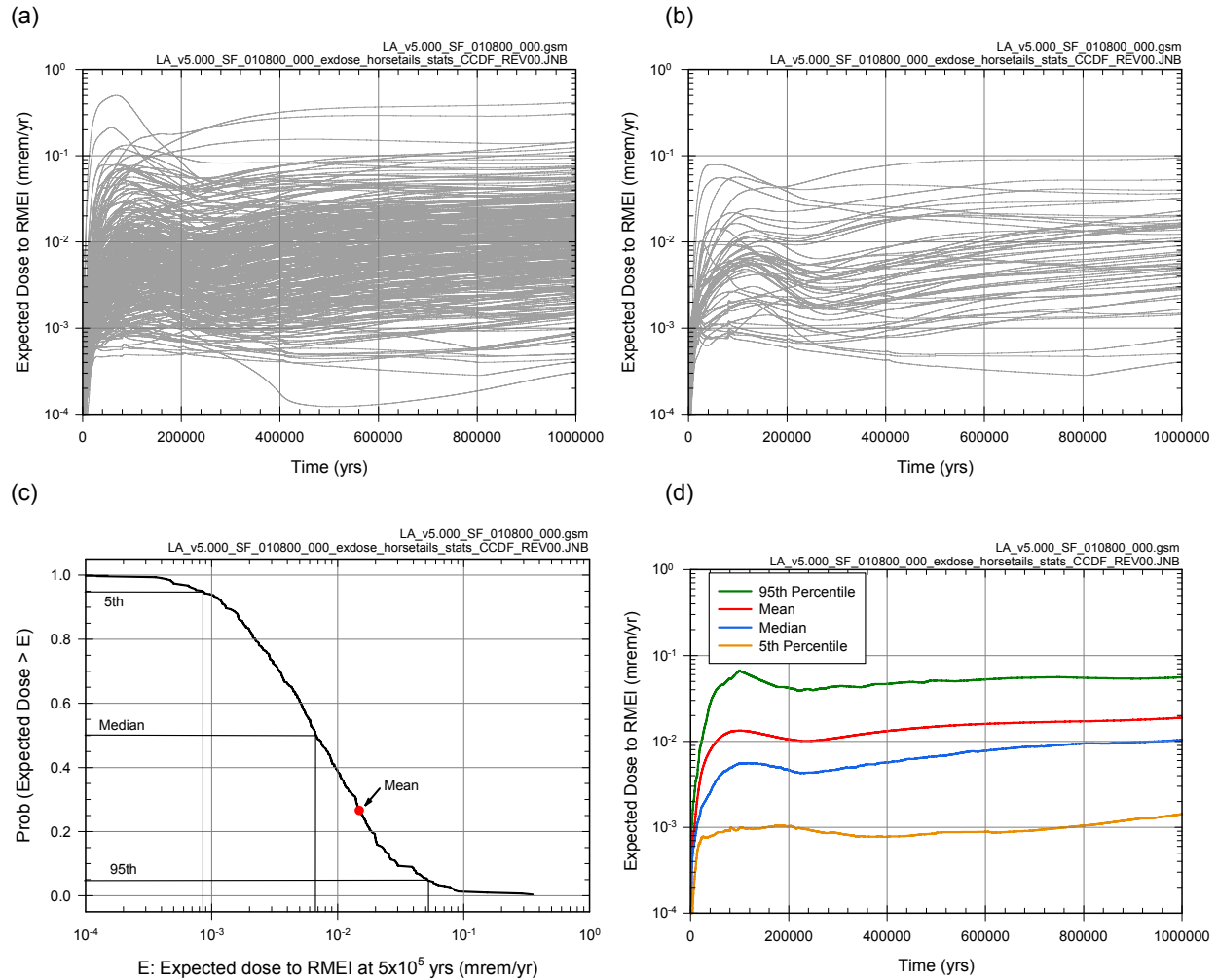
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-14. Illustration of interpolation procedure to estimate integrals $\hat{I}_r(\tau|t, \mathbf{e}_{M1})$ and expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$ from calculated doses $D_{SF,r}(\tau|[1, t_j, 100, A_{rk}, 1, \sim], \mathbf{e}_{M1})$ in Equation J8.6-18 for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and the time interval $[0, 1.0 \times 10^6 \text{ yr}]$: (a) $D_{SF,1}(\tau|[1, t_j, 100, A_{rk}, 1, \sim], \mathbf{e}_{M1})$ for $j = 1, 2, \dots, 6$ and $k = 1, 2, 3$ (Notes: Results overlay for A_{1k} , $k = 1, 2, 3$, for each t_j , and results for t_1 and t_2 also overlay), (b) Interpolated values $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_{M1})$ for \hat{t}_k between $t_4 = 2.0 \times 10^5 \text{ yr}$ and $t_5 = 4.0 \times 10^5 \text{ yr}$, (c) Interpolated values for $\hat{I}_1(\tau|\hat{t}_k, \mathbf{e}_{M1})$ for \hat{t}_k between 1000 and $1.0 \times 10^6 \text{ yr}$, and (d) estimates for $\bar{D}_{SF,1}(\tau|\mathbf{e}_i)$ for CSNF WPs, $\bar{D}_{SF,2}(\tau|\mathbf{e}_i)$ for CDSP WPs and $\bar{D}_{SF}(\tau|\mathbf{e}_i)$ for CSNF and CDSP WPs.



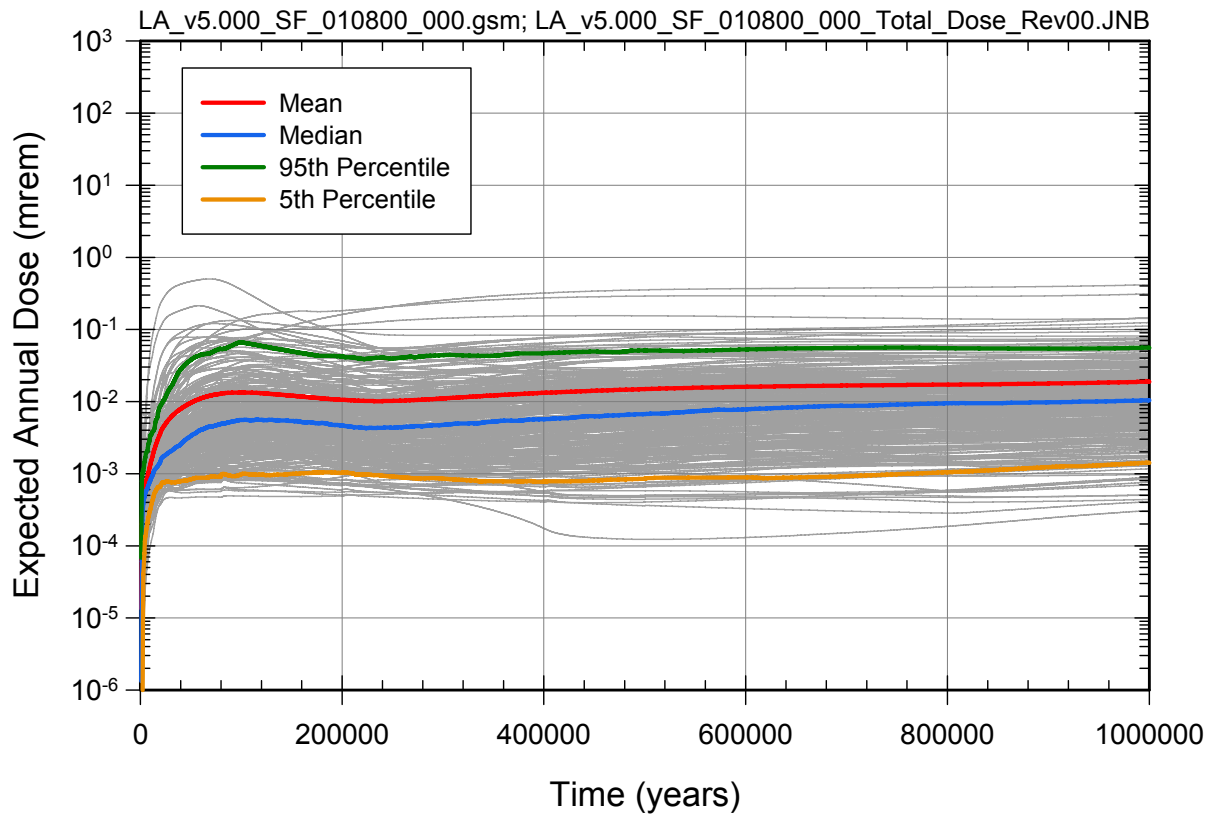
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-15. Estimate of $\bar{D}_{SF}(\tau|\mathbf{e}_1)$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ and $0 \leq \tau \leq 10^6$ yr with integration-based procedure indicated in Equations J8.6-17 and J8.6-25.



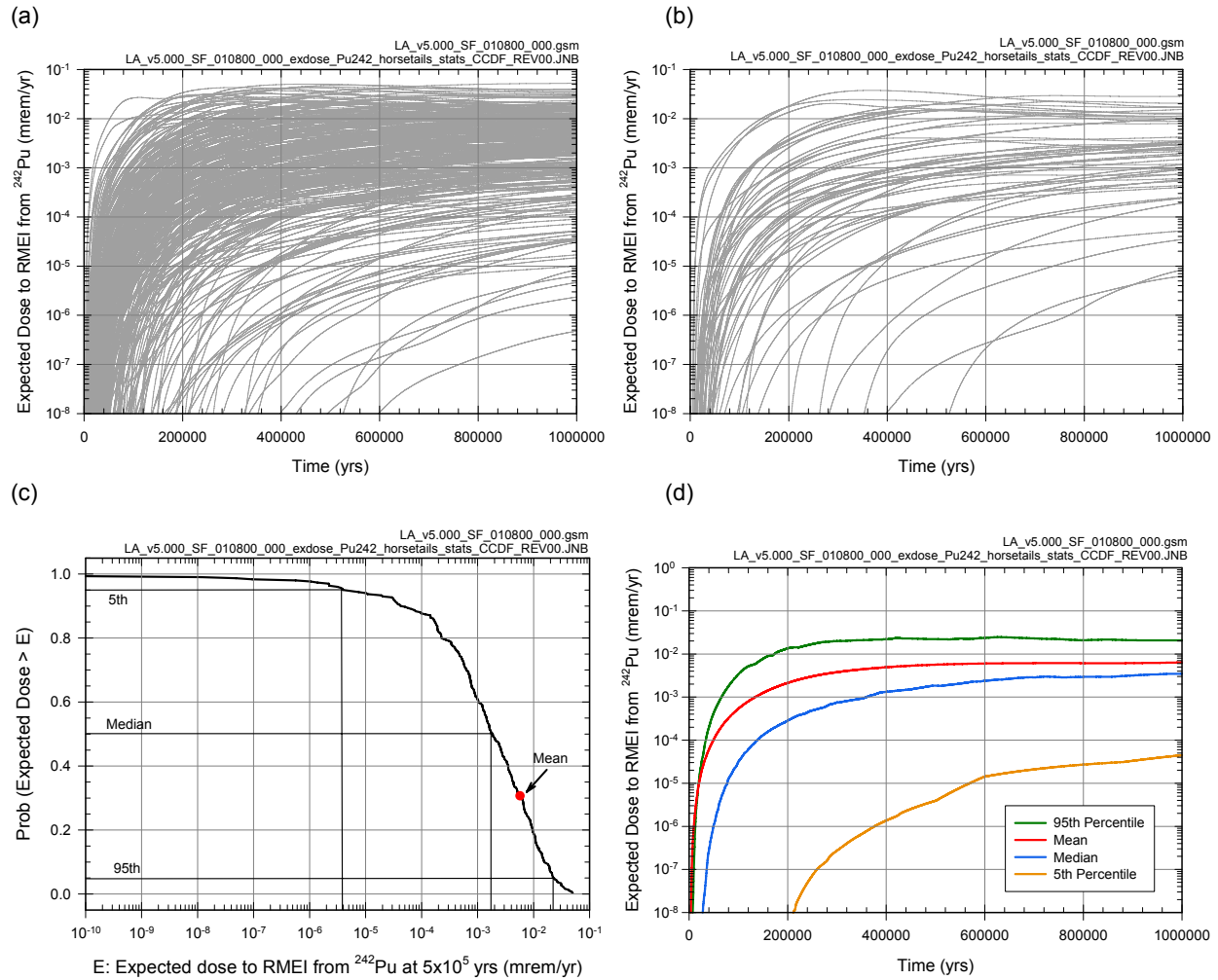
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-16. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr that at results when only fault displacement events are considered: (a) expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SF}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 5 \times 10^5$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SF}(\tau)$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



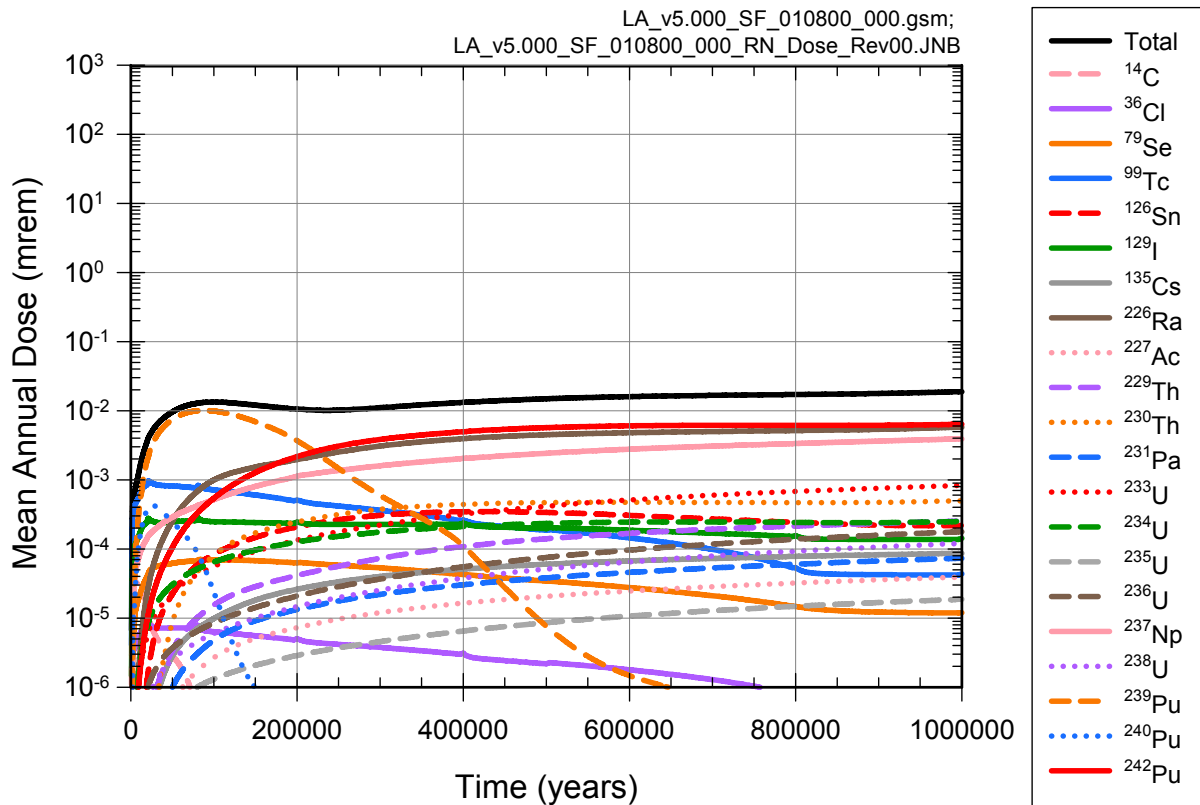
Source: Output DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-17. Summary of results obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr that results when only fault displacement events are considered.



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

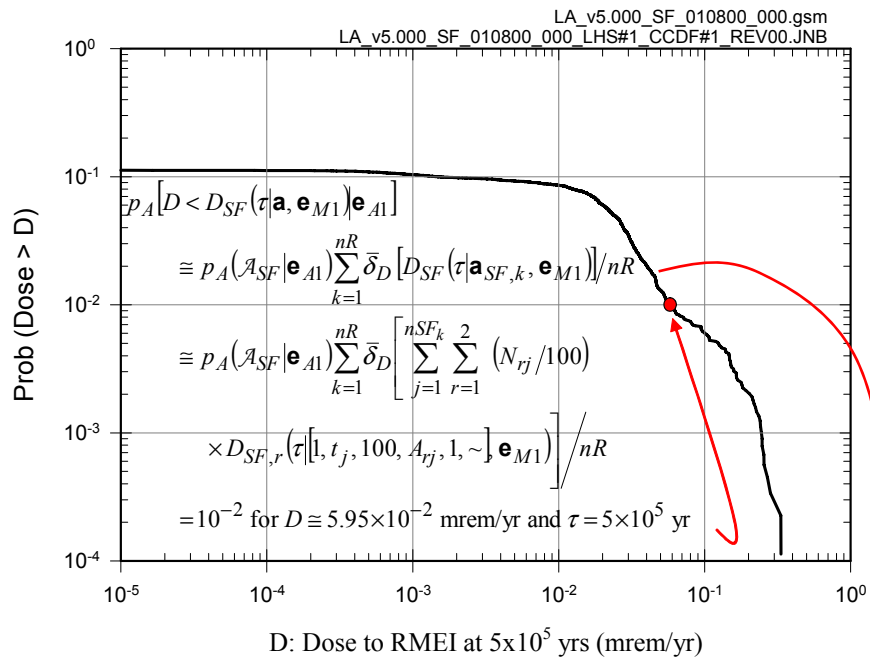
Figure J8.6-18. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr with r corresponding to ^{242}Pu that results when only fault displacement events are considered: (a) expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}_{SF,r}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}_{SG,r}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}_{SF,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 500,000$ yr, and (d) expected (mean) dose $\bar{\bar{D}}_{SF,r}(\tau)$ and quantiles $Q_q[\bar{D}_{SF,r}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



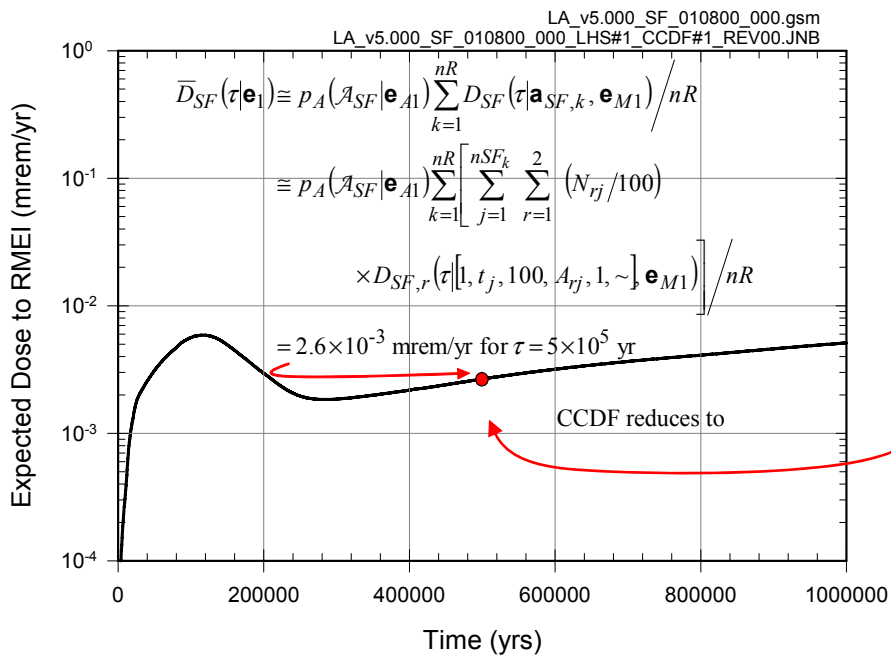
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-19. Estimates obtained with LHS of size $n_{LHS} = 300$ of expected (mean) dose $\bar{D}_{SF,r}(\tau)$ to RMEI for $0 \leq \tau \leq 10^6$ yr for individual radioactive species that result when only seismic ground motion events are considered.

(a)

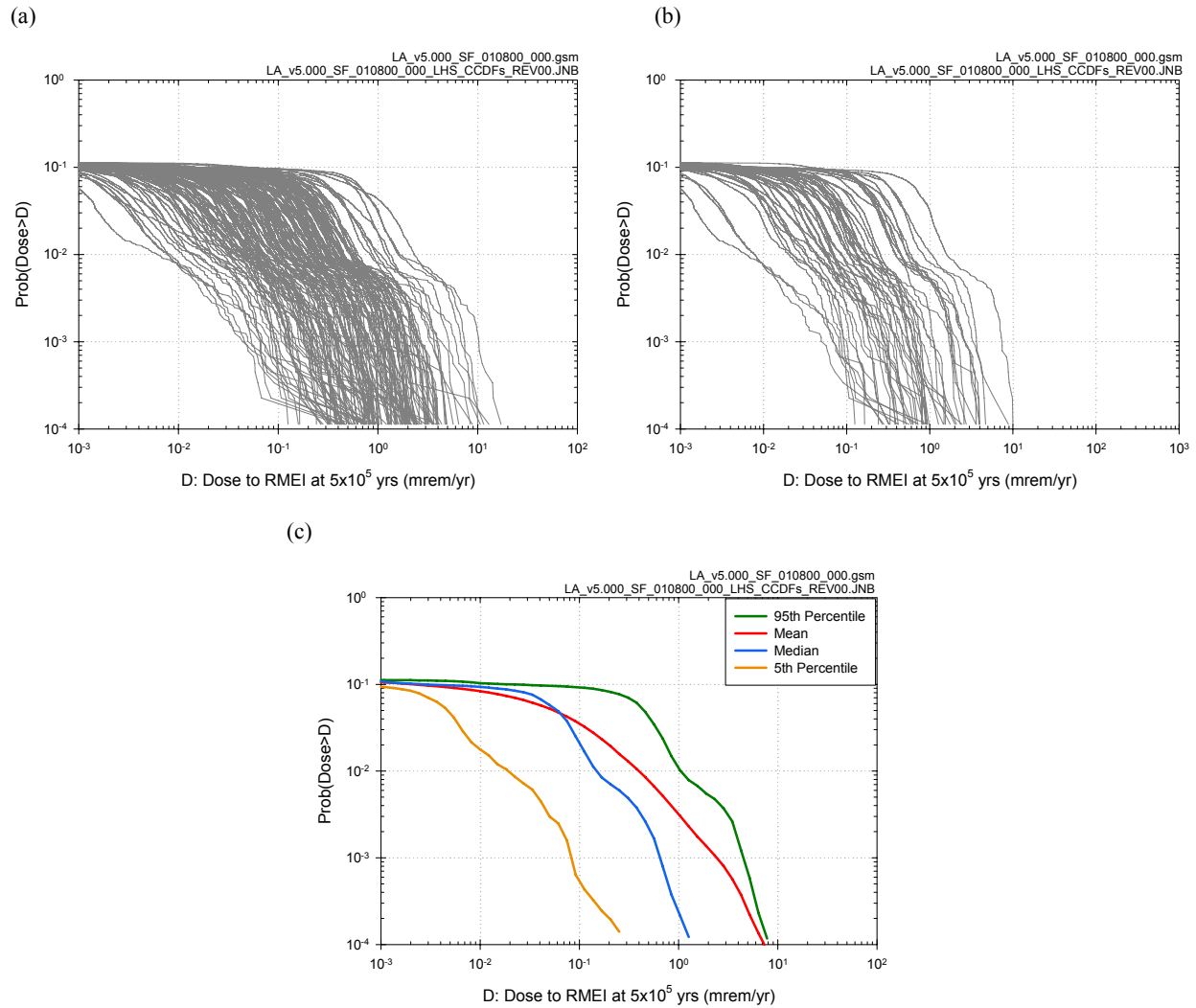


(b)



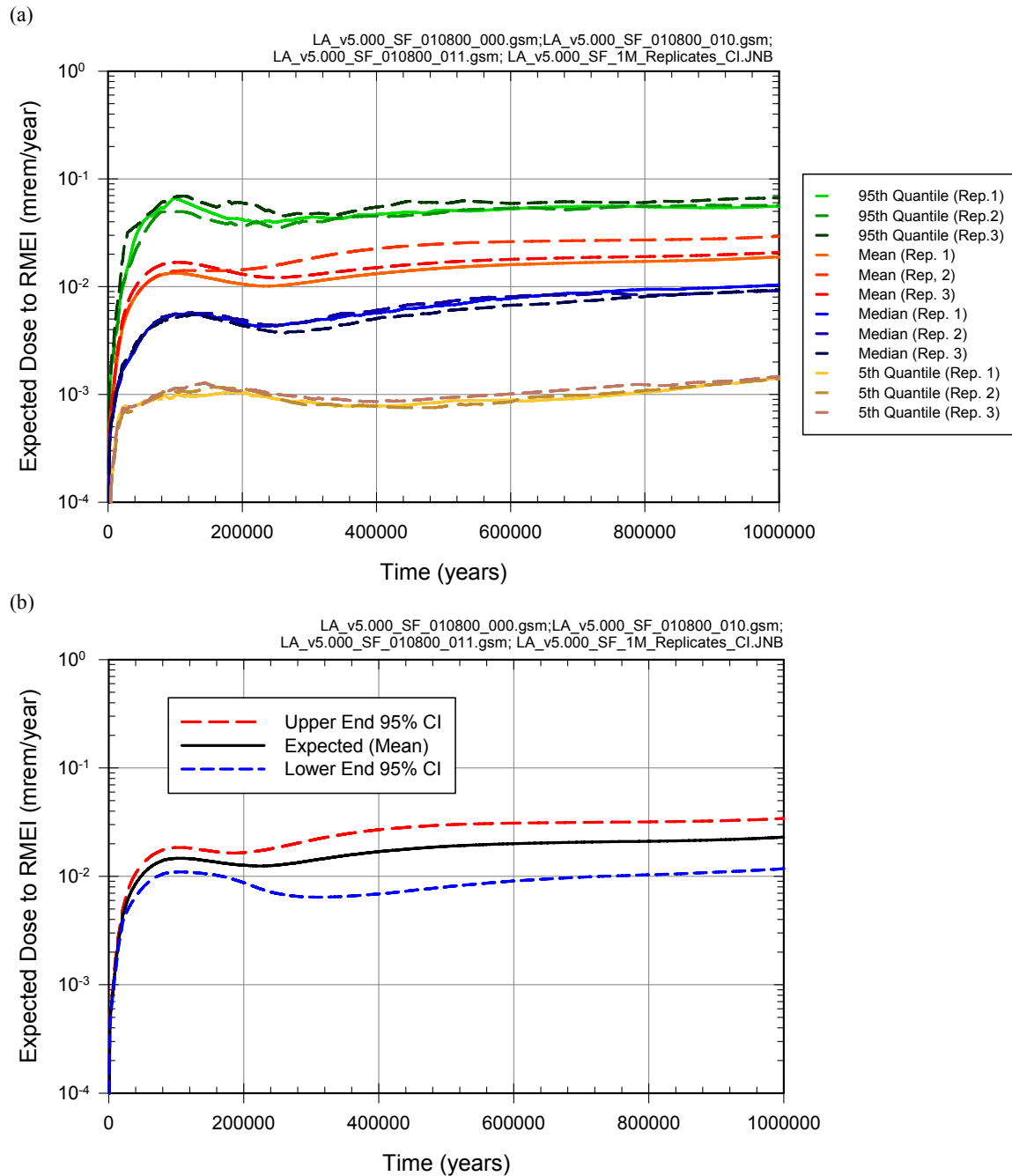
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J8.6-20. Results associated with $D_{SF}(\tau|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ for LHS element $\mathbf{e}_1 = [\mathbf{e}_{A1}, \mathbf{e}_{M1}]$ obtained with sampling-based (Monte Carlo) procedures: (a) CCDF for $D_{SF}(5 \times 10^5 \text{ yr}|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ with exceedance probabilities $p_A[D < D_{SF}(5 \times 10^5 \text{ yr}|\mathbf{a}, \mathbf{e}_{M1})|\mathbf{e}_{A1}]$ defined in Equations J4.5-19 and J8.6-36, and (b) expected dose $\bar{D}_{SF}(5 \times 10^5 \text{ yr}|\mathbf{e}_1)$ associated with $D_{SF}(5 \times 10^5 \text{ yr}|\mathbf{a}_{SF}, \mathbf{e}_{M1})$ defined in Equation J4.5-20.



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

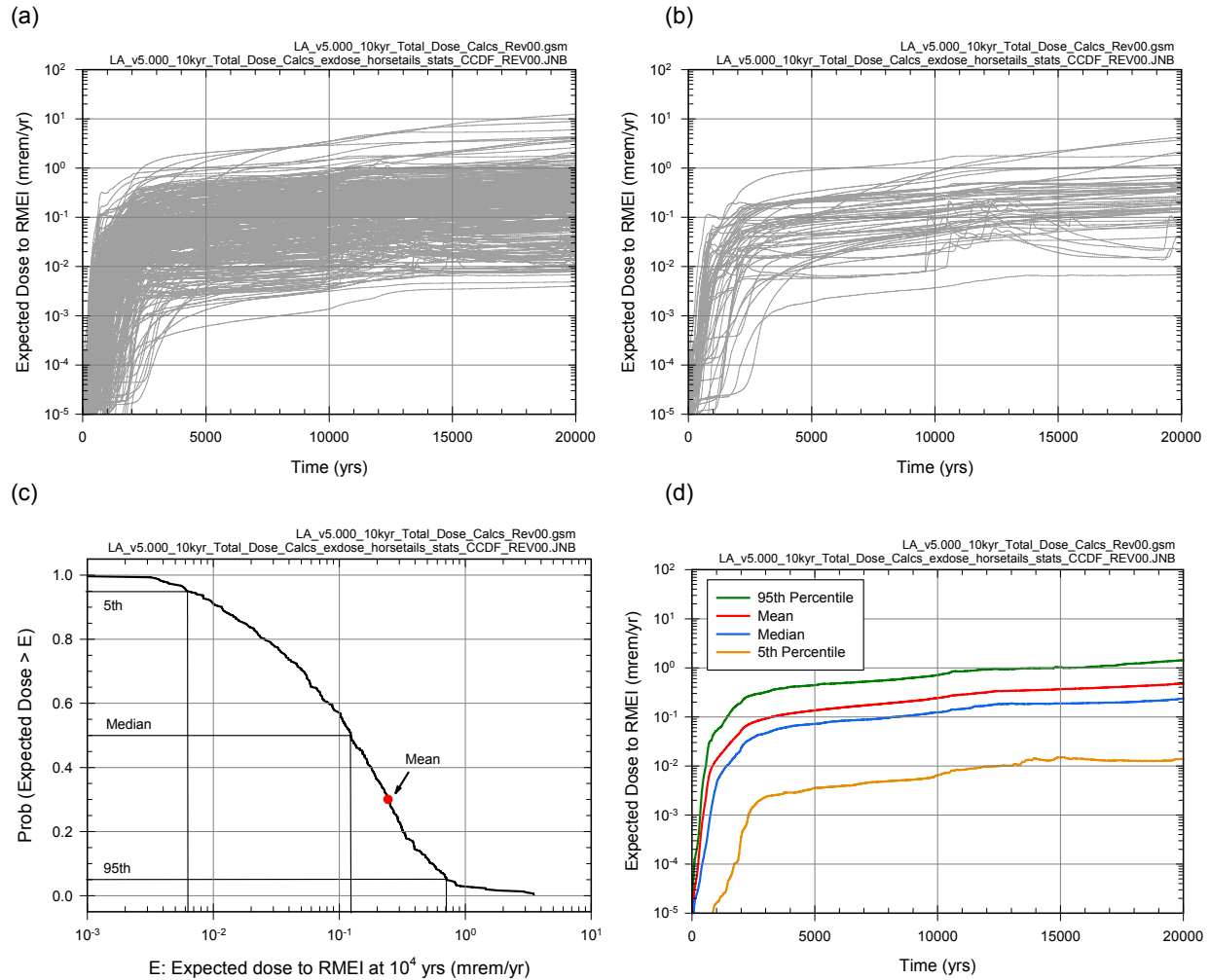
Figure J8.6-21. Results associated with $D_{SG}(5 \times 10^5 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_M)$ obtained with sampling-based (Monte Carlo) procedures for an LHS of size $nLHS = 300$: (a) CCDFs for $D_{SF}(5 \times 10^5 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SF}(5 \times 10^5 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, nLHS = 300$, (b) CCDFs for $D_{SF}(10^4 \text{ yr} | \mathbf{a}_{SF}, \mathbf{e}_{Mi})$ with exceedance probabilities $p_A[D < D_{SF}(5 \times 10^5 \text{ yr} | \mathbf{a}, \mathbf{e}_{Mi}) | \mathbf{e}_{Ai}]$ defined in Equation J4.5-19 for $i = 1, 2, \dots, 50$, and (c) expected (mean) CCDF and quantile curves, $q = 0.05, 0.5, 0.95$, for CCDFs in (a).



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

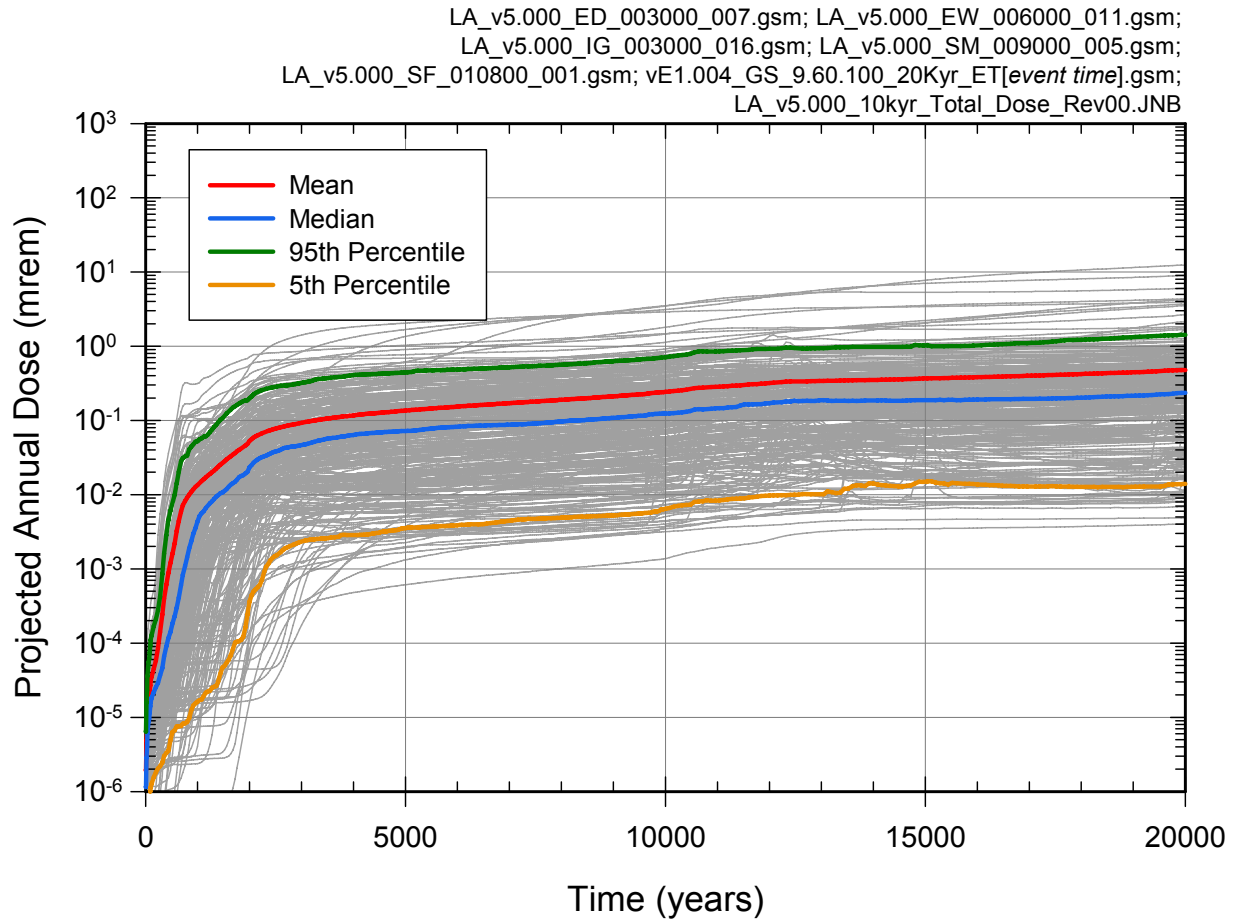
Figure J8.6-22. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}_{SF}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 10^6$ yr that results when only seismic ground motion events are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}_{SF}(\tau)$ and quantiles $Q_q[\bar{D}_{SF}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}_{SF}(\tau)$.

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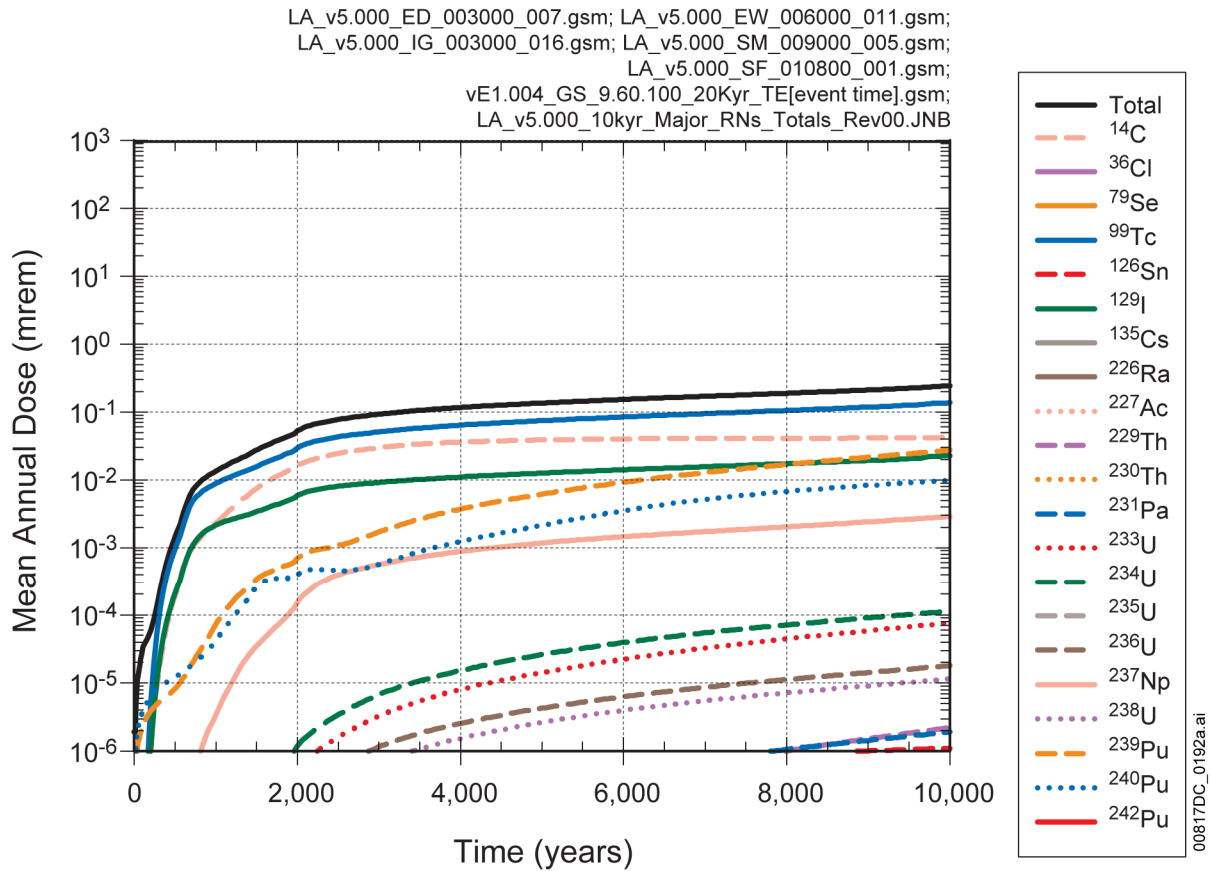
Source: Ouput DTN: MO0709TSPAPLOT.000 [DIRS 183010].

Figure J9.2-1. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when all futures are considered: (a) expected dose $\bar{D}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{\bar{D}}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



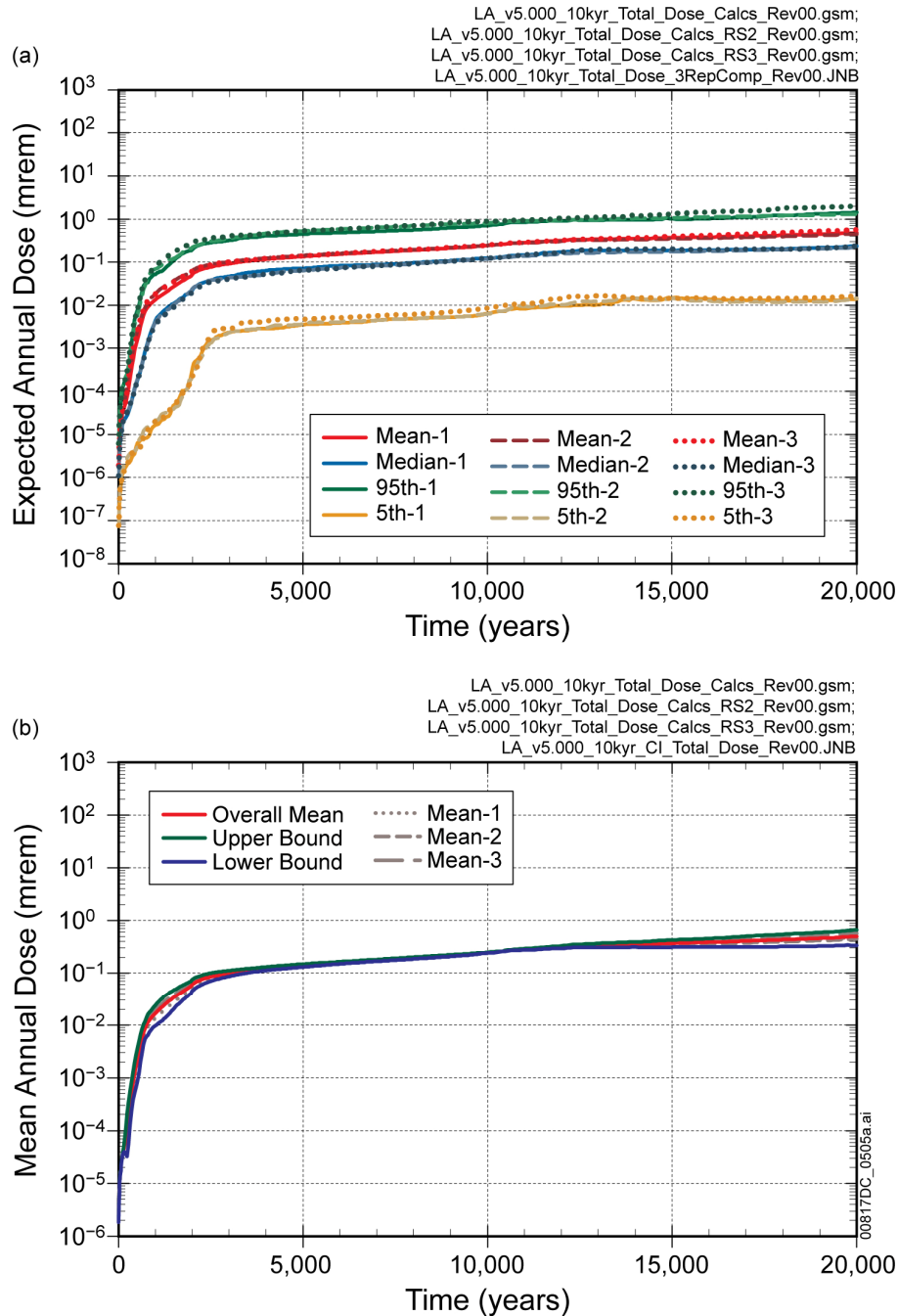
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J9.2-2. Summary of results obtained with LHS of size $n_{LHS} = 300$ showing epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when all futures are considered.



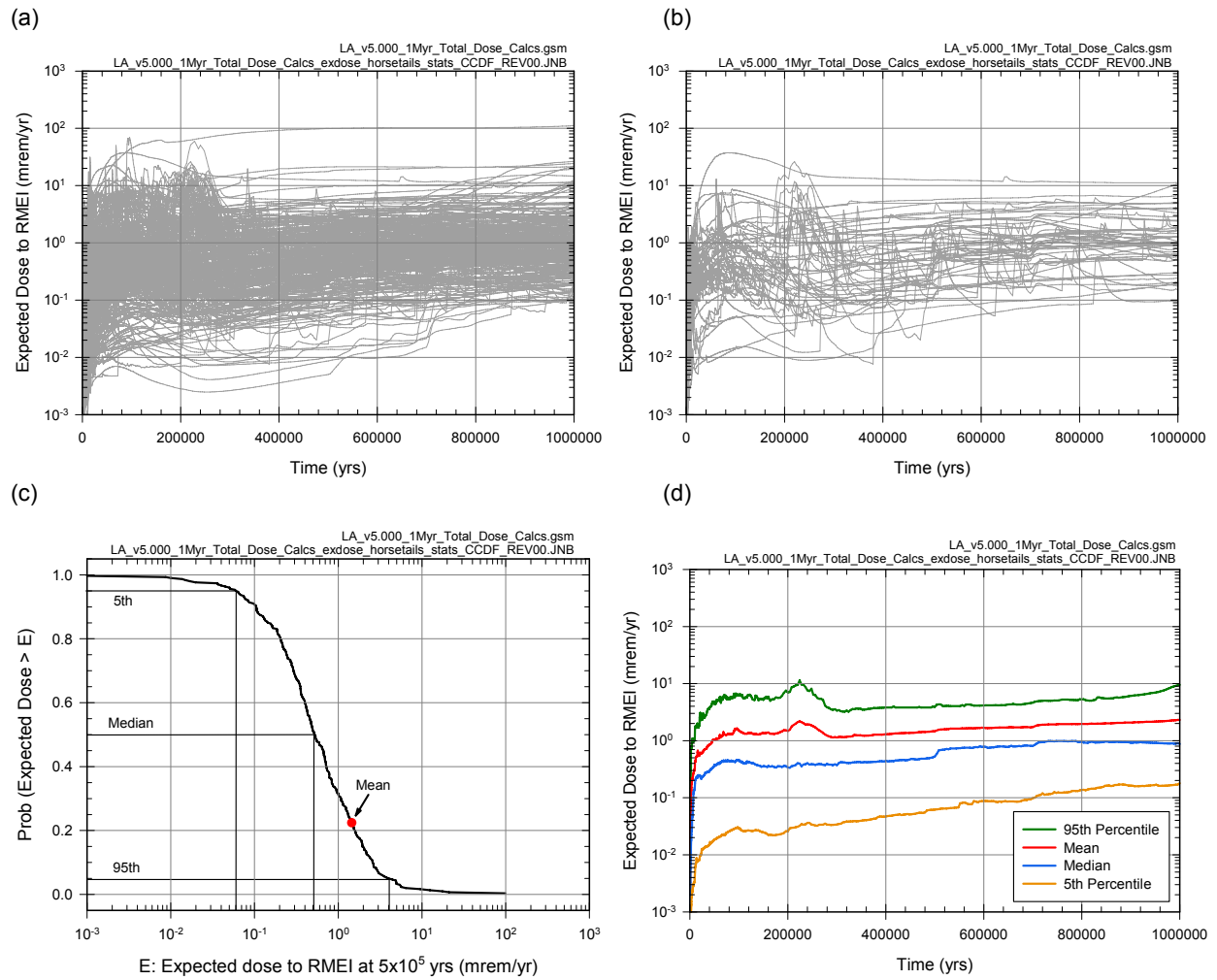
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J9.2-3. Estimates obtained with LHS of size $n_{LHS} = 300$ of expected (mean) dose $\bar{D}(\tau)$ to RMEI for $0 \leq \tau \leq 20,000$ yr for individual radioactive species that result when all futures are considered.



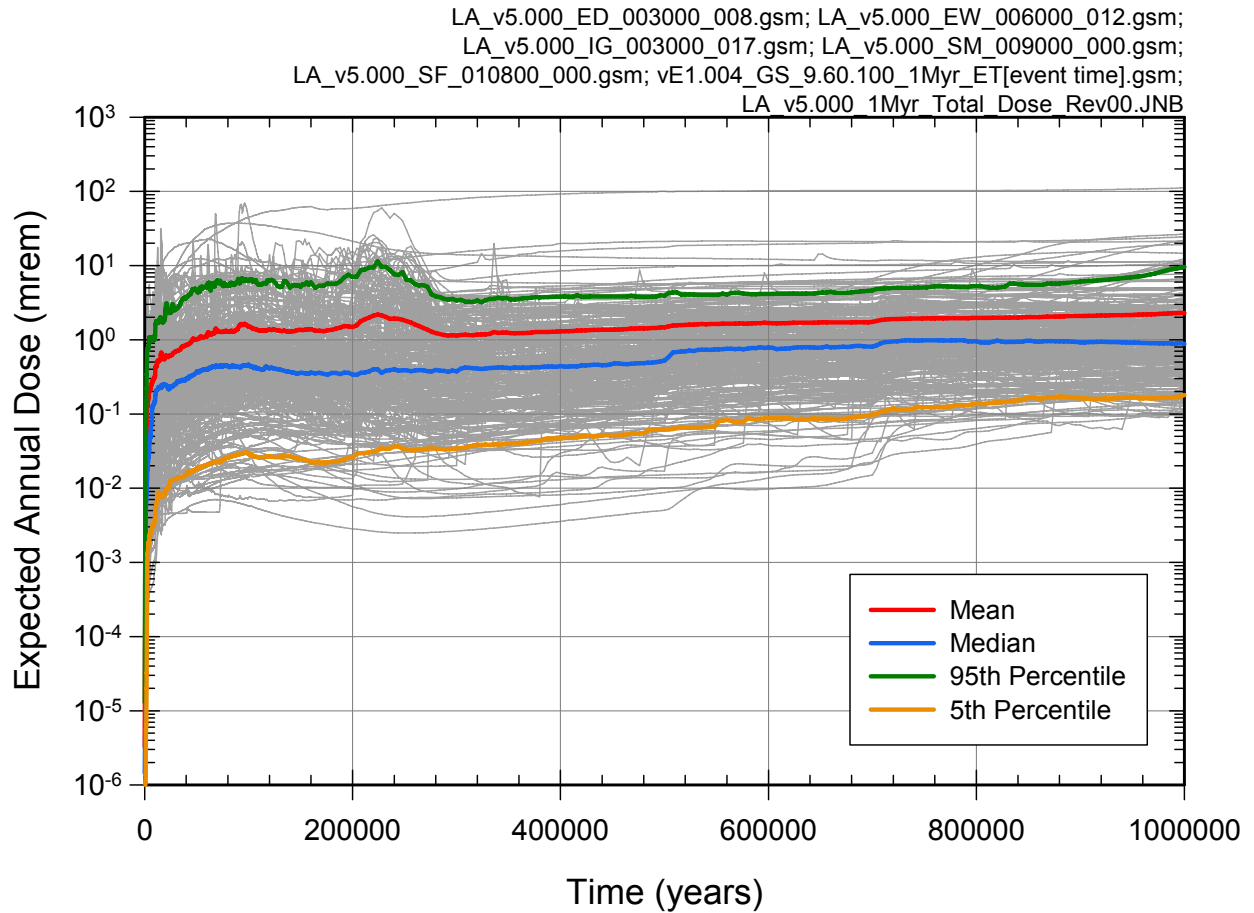
Source: Ouput DTN: MO0709TSPAPLOT.000 [DIRS 183010].

Figure J9.2-4. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 20,000$ yr that results when all futures are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}(\tau)$ and quantiles $Q_q[\bar{D}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}(\tau)$.



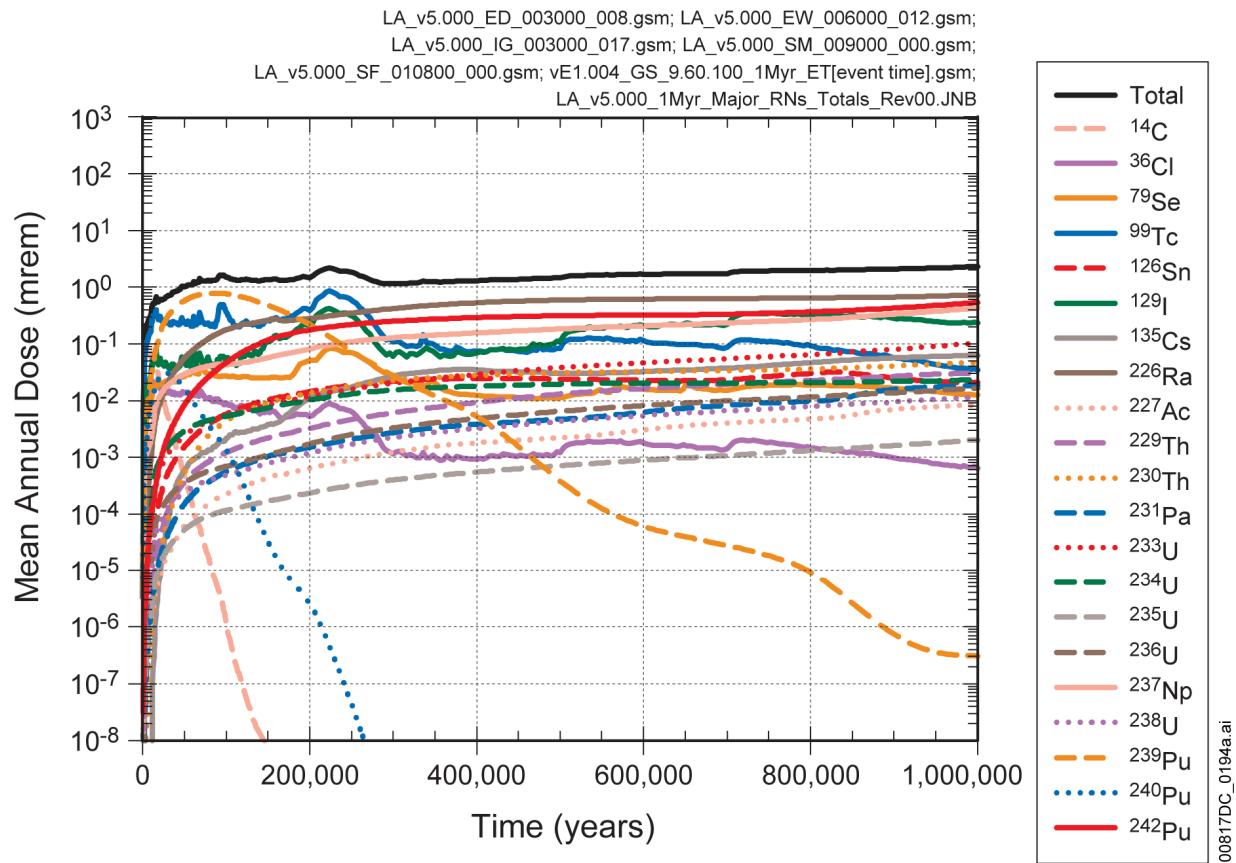
Source: Ouput DTN: MO0709TSPAPLOT.000 [DIRS 183010].

Figure J9.3-1. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr that results when all futures are considered: (a) expected dose $\bar{D}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, nLHS = 300$, (b) expected dose $\bar{D}(\tau|\mathbf{e}_i)$, $i = 1, 2, \dots, 50$, (c) exceedance probabilities $p_E[D < \bar{D}(\tau|\mathbf{e})]$ and quantiles $Q_q[\bar{D}(\tau|\mathbf{e})]$, $q = 0.05, 0.5$ and 0.95 , for $\tau = 10^4$ yr, and (d) expected (mean) dose $\bar{\bar{D}}(\tau)$ and quantiles $Q_q[\bar{\bar{D}}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$.



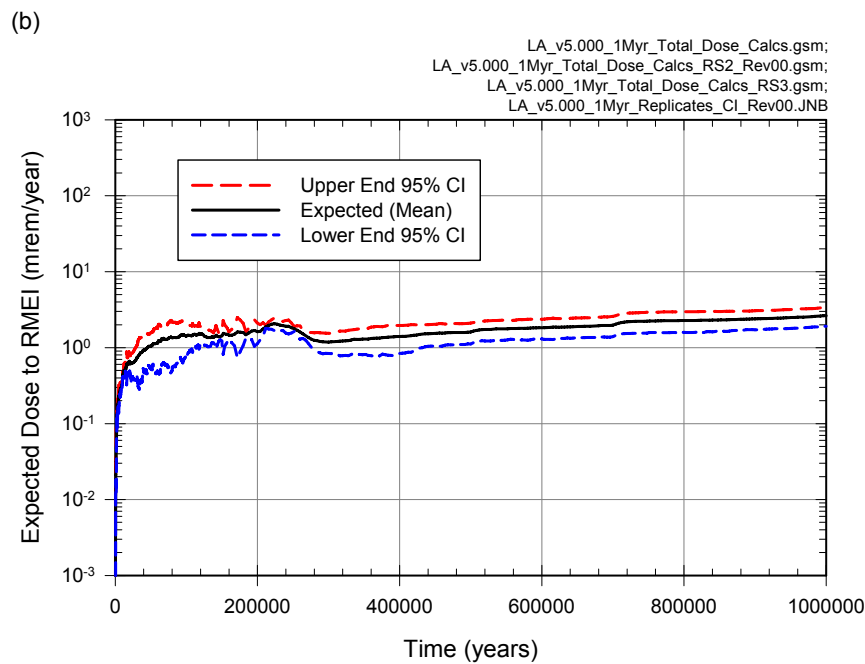
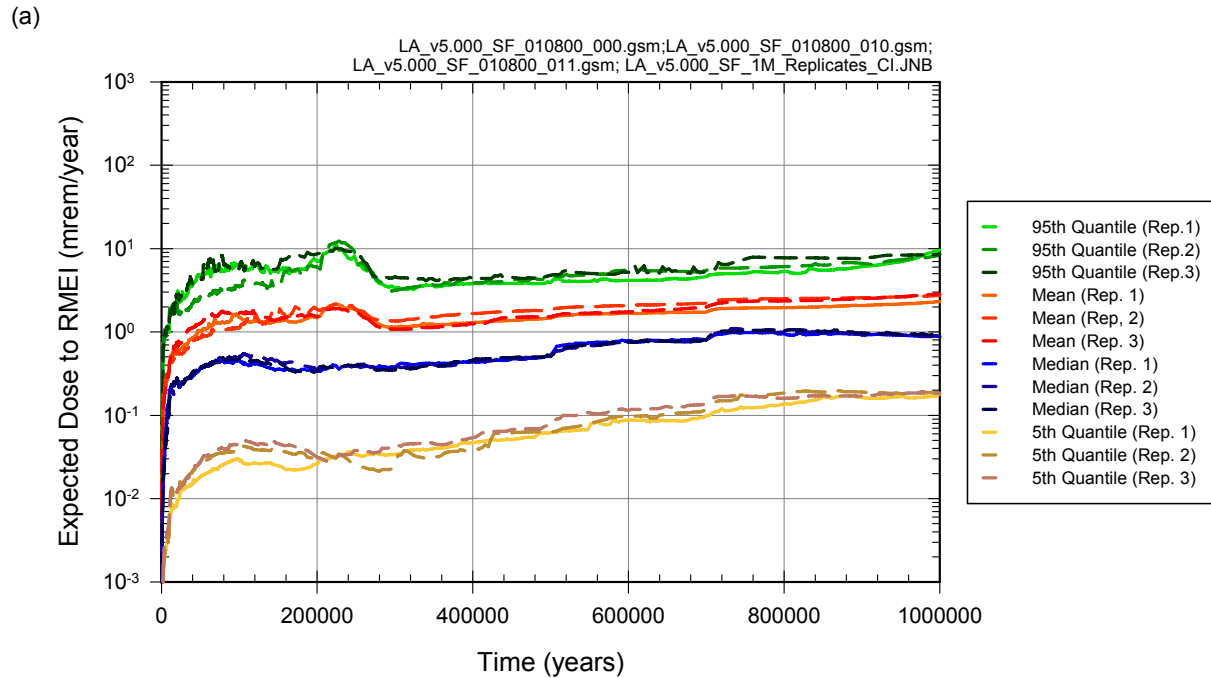
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J9.3-2. Summary of results obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr that results when all futures are considered.



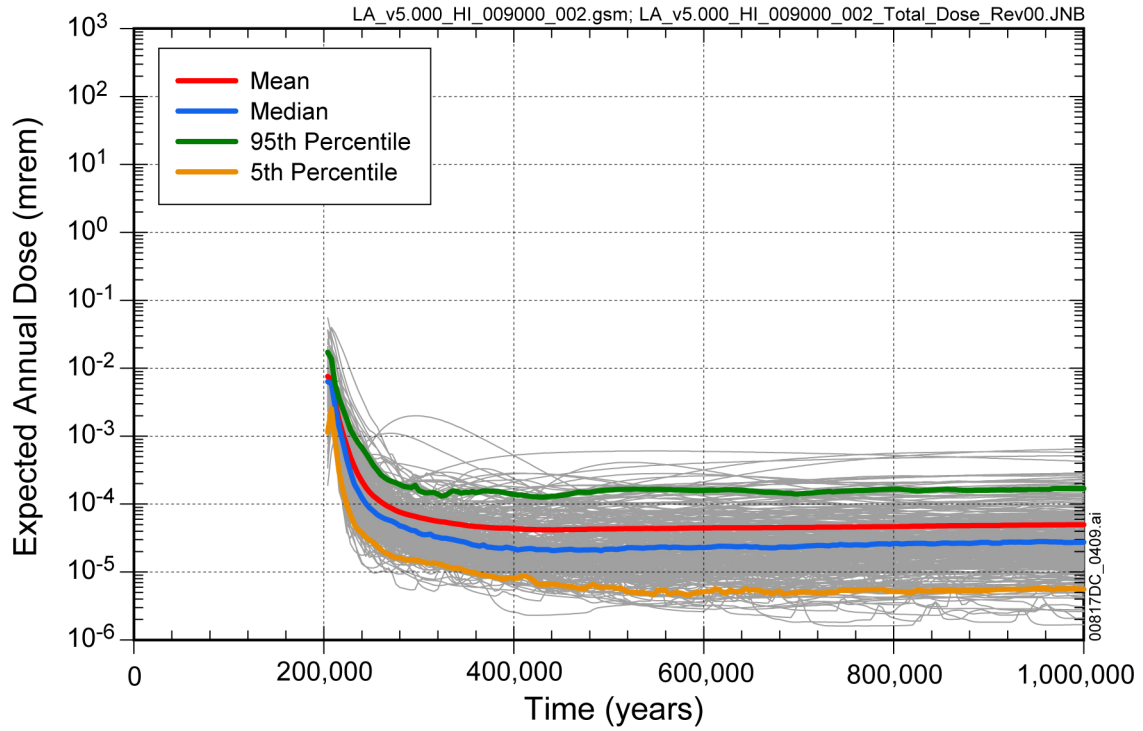
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J9.3-3. Estimates obtained with LHS of size $nLHS = 300$ of expected (mean) dose $\bar{D}_r(\tau)$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr for individual radioactive species that result when all futures are considered.



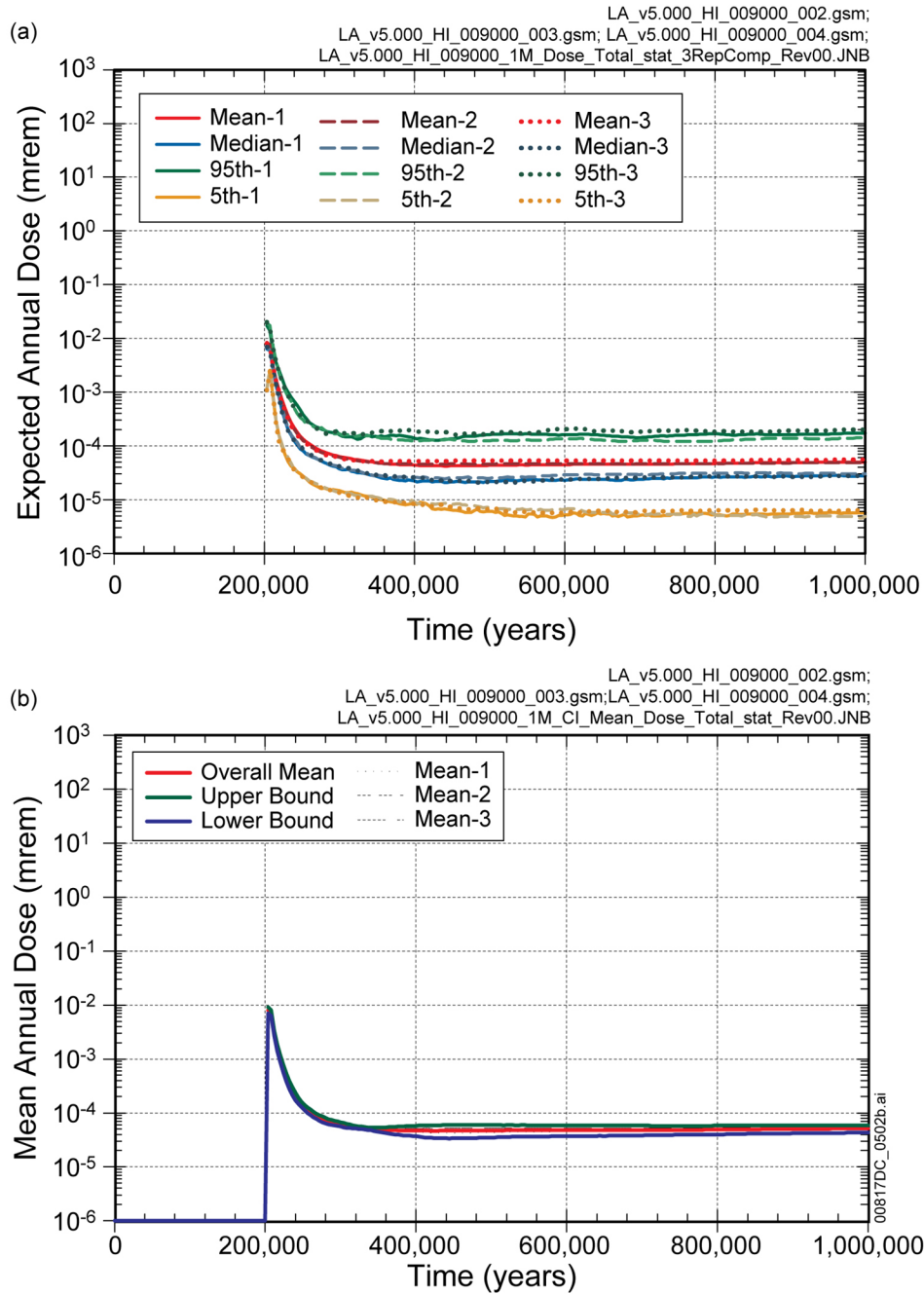
Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

Figure J9.3-4. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr that results when all futures are considered: (a) Replicated estimates of expected (mean) dose $\bar{D}(\tau)$ and quantiles $Q_q[\bar{D}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}(\tau|\mathbf{e})$.



Source: Ouput DTNs: MO0709TSPAPLOT.000 [DIRS 183010]; and MO0709TSPAREGS.000 [DIRS 182976].

Figure J11.2-1. Estimate obtained with LHS of size $nLHS = 300$ showing epistemic uncertainty in expected dose $\bar{D}_{HI}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr that results from a single drilling intrusion at 200,000 years.



Source: Output DTNs: MO0709TSPASTAB.000 [DIRS 182983]; MO0709TSPAREGS.000 [DIRS 182976]; and MO0709TSPASTAB.000 [DIRS 182983].

Figure J11.2-2. Assessment with replicated sampling of numerical error associated with use of an LHS of size $n_{LHS} = 300$ to determine epistemic uncertainty in expected dose $\bar{D}_{HI}(\tau|\mathbf{e})$ to RMEI for $0 \leq \tau \leq 1,000,000$ yr that results from a single drilling intrusion at 200,000 years: (a) Replicated estimates of expected (mean) dose $\bar{D}_{HI}(\tau)$ and quantiles $Q_q[\bar{D}_{HI}(\tau|\mathbf{e})]$, $q = 0.05, 0.5, 0.95$, and (b) confidence intervals for estimates of expected (mean) dose $\bar{D}_{HI}(\tau)$.