

Induced Activity in Lead Based Materials

Here are given results of routine induced activity simulations in the ATLAS detector materials. Two lead based materials were studied—chemical pure lead and hard lead (PB-Sb alloy). Elementary composition is given in the table below.

Fig. 1-12 present contact dose rate for chemical lead.

Fig. 13-24 present contact dose rate for hard lead.

Table

Concentration of elements in materials, %

Element	Chemical Lead, UNS L51120	Hard Lead, UNS L52901
Fe	<0.002	
Cu	0.04 - 0.08	
Zn	<0.001	
As	<0.002	
Ag	0.002 - 0.02	
Sn	<0.002	
Sb	<0.002	3
Pb	99.9	97
Bi	<0.005	

Chemical Lead T=30d, t=1d

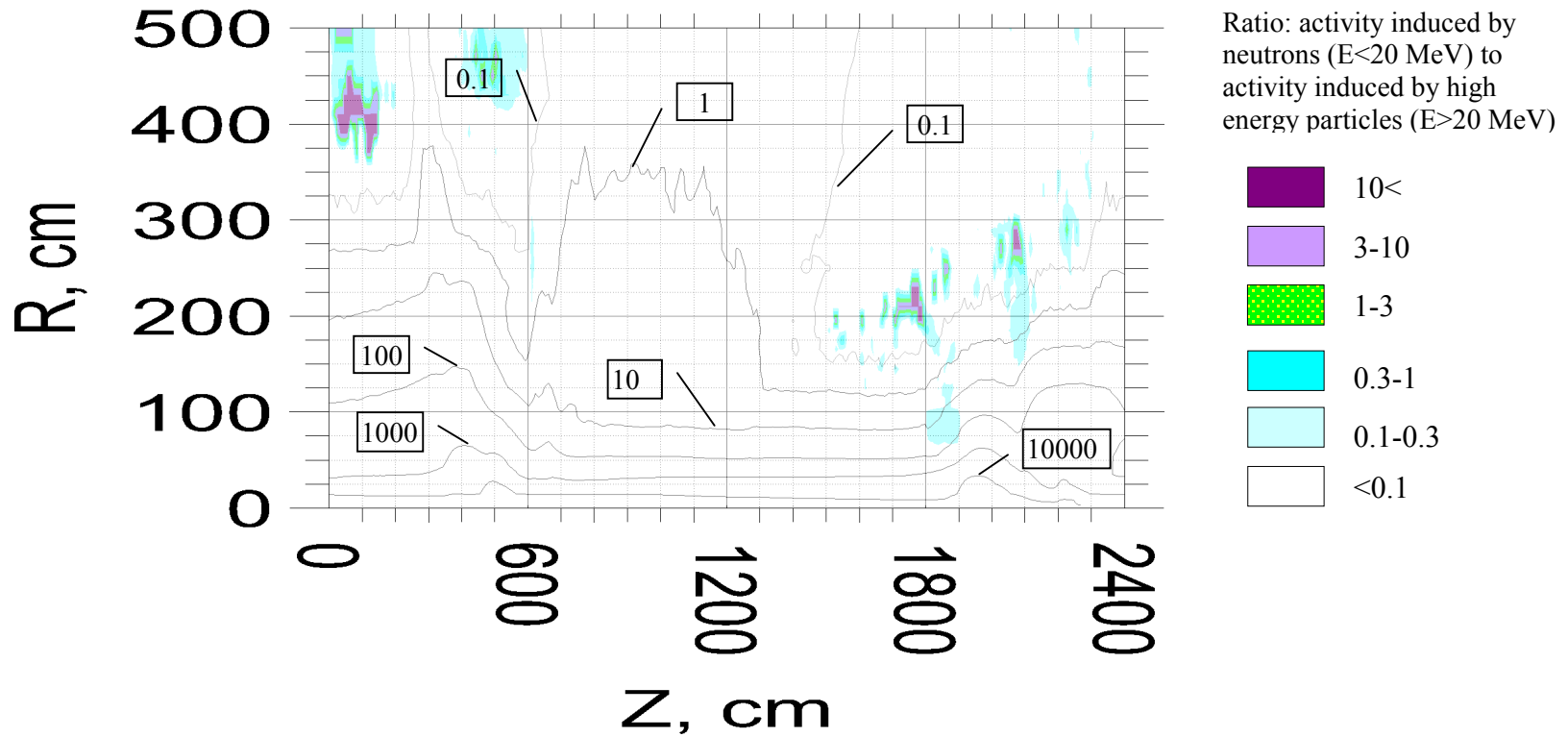


Fig .1. Distribution of induced radioactivity in Chemical Lead calculated at T=30d, t=1d The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=30d, t=5d

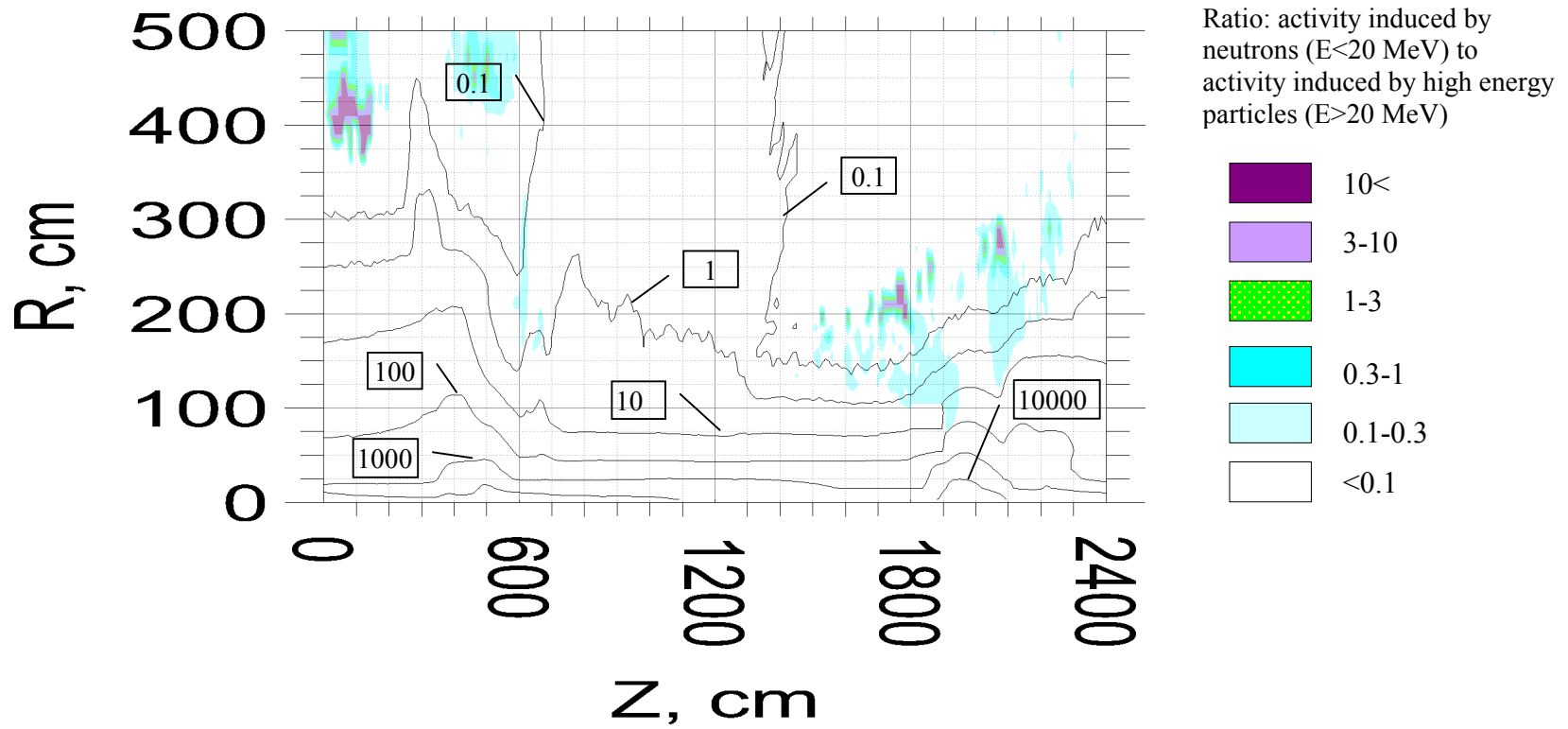


Fig .2. Distribution of induced radioactivity in Chemical Lead calculated at T=30d, t=5d The levels show contact dose rate in $\mu\text{Sv/h}$.

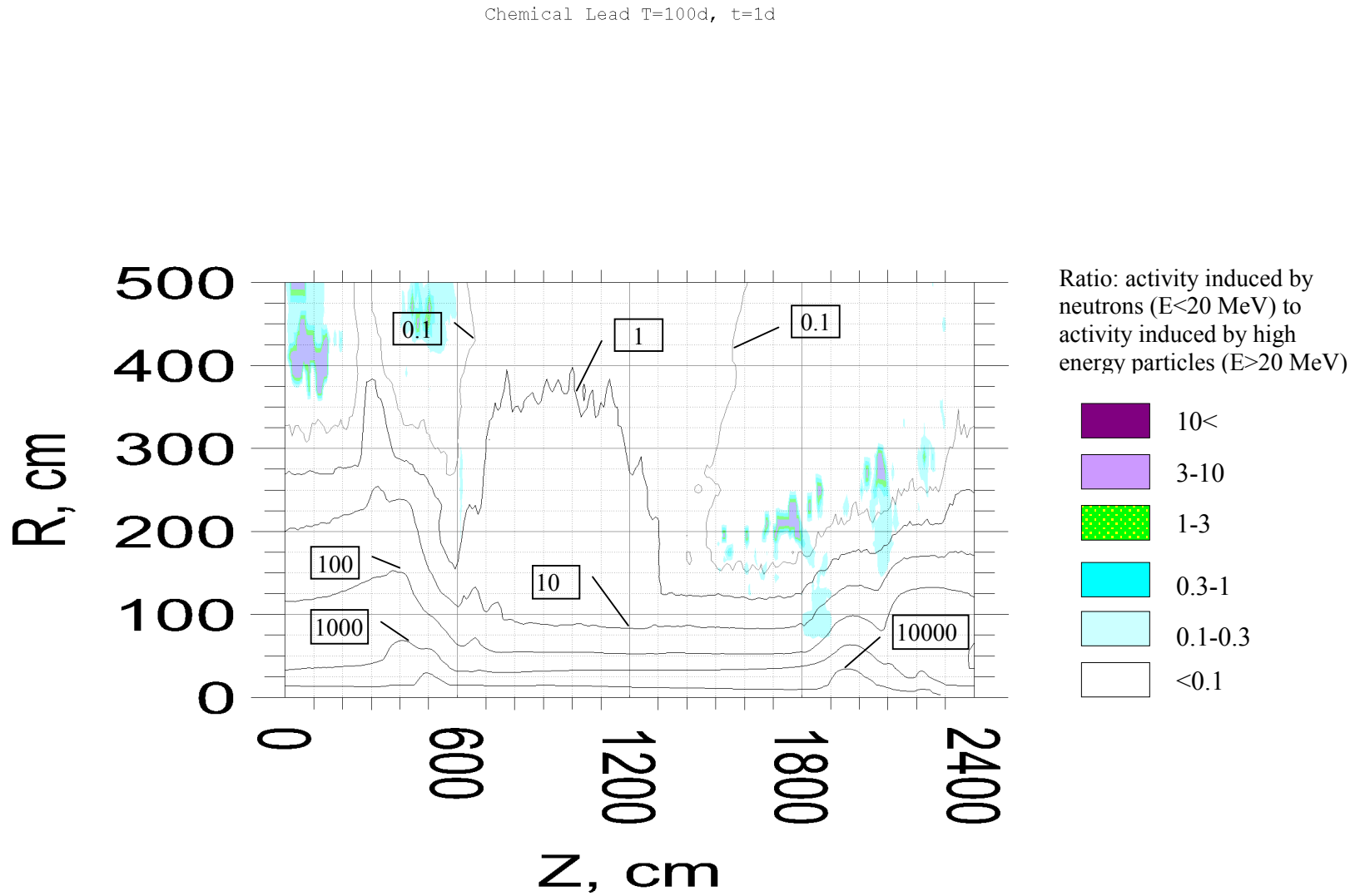


Fig .3. Distribution of induced radioactivity in Chemical Lead calculated at T=100d, t=1d. The levels show contact dose rate in $\mu\text{Sv/h}$.

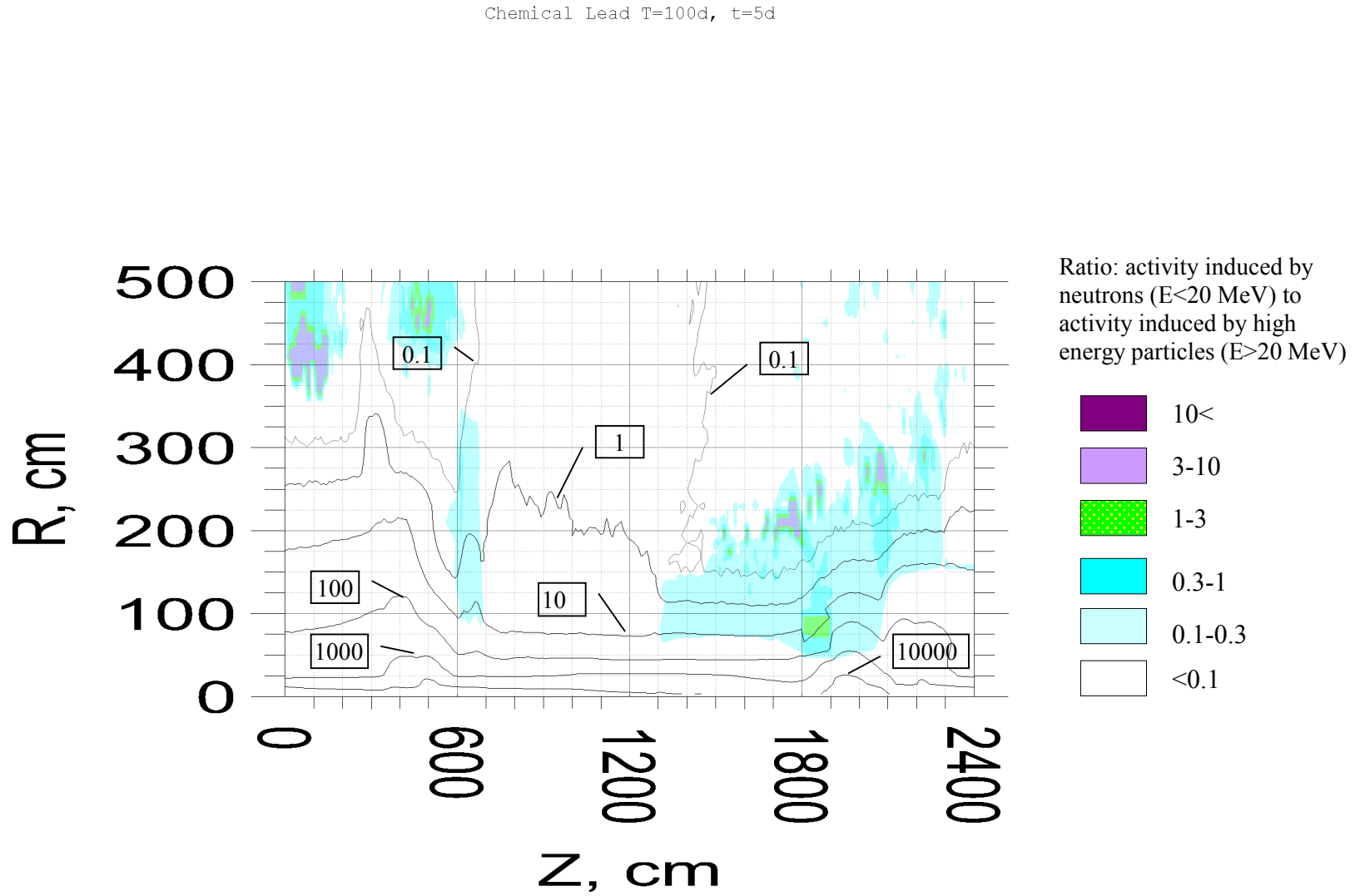


Fig .4. Distribution of induced radioactivity in Chemical Lead calculated at T=100d, t=5d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=100d, t=30d

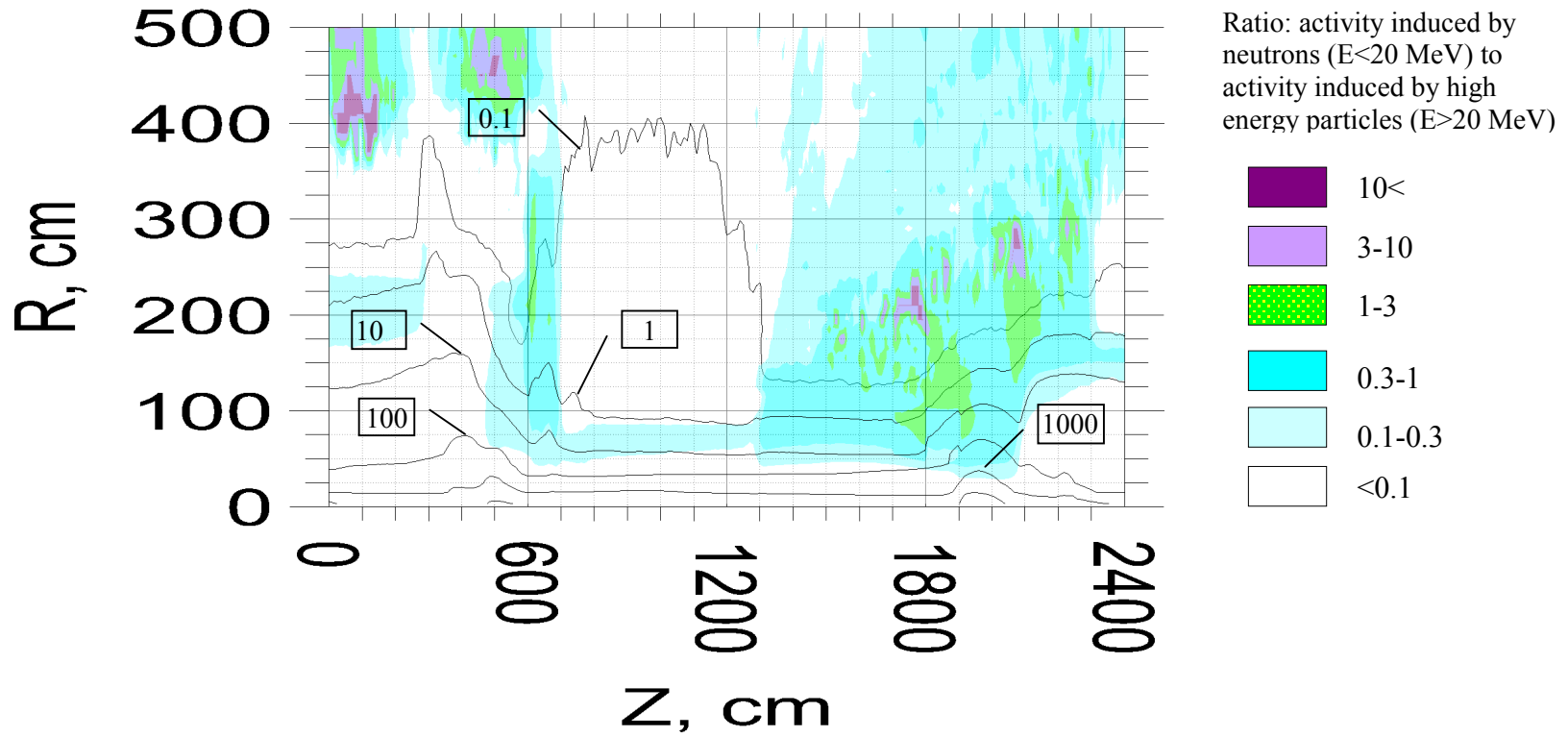


Fig .5. Distribution of induced radioactivity in Chemical Lead calculated at T=100d, t=30d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=100d, t=100d

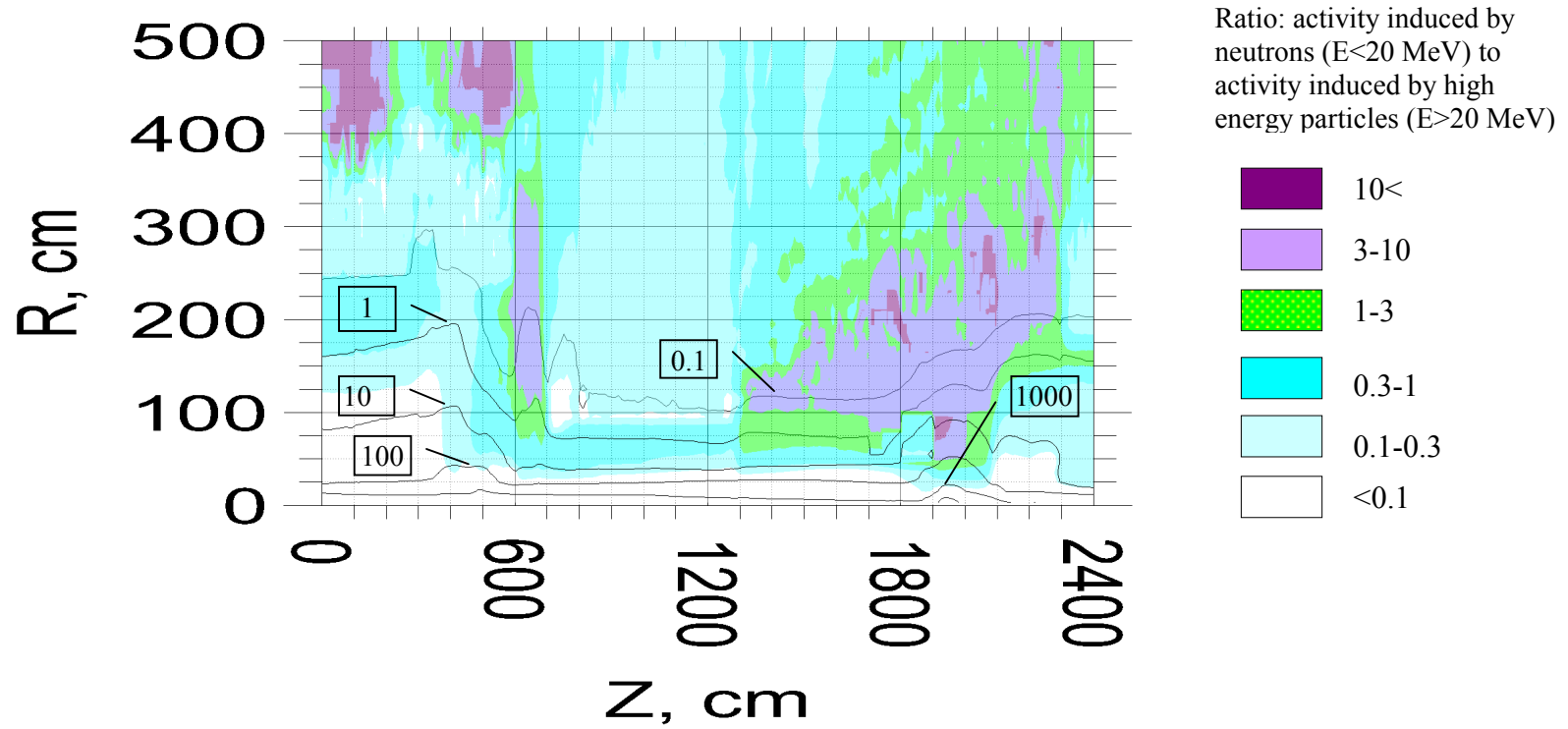


Fig .6. Distribution of induced radioactivity in Chemical Lead calculated at T=100d, t=100d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 1d

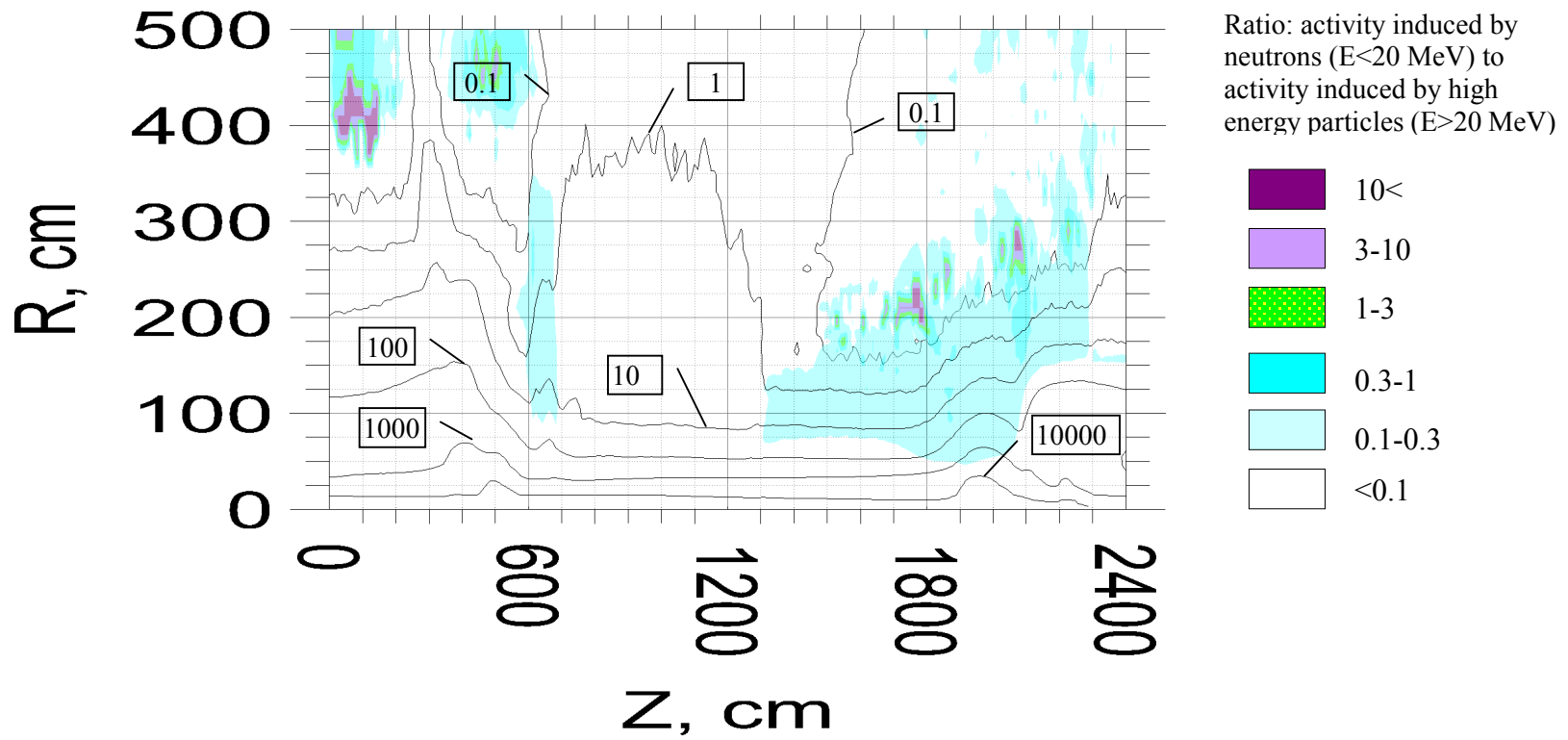


Fig .7. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=1d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 5 d

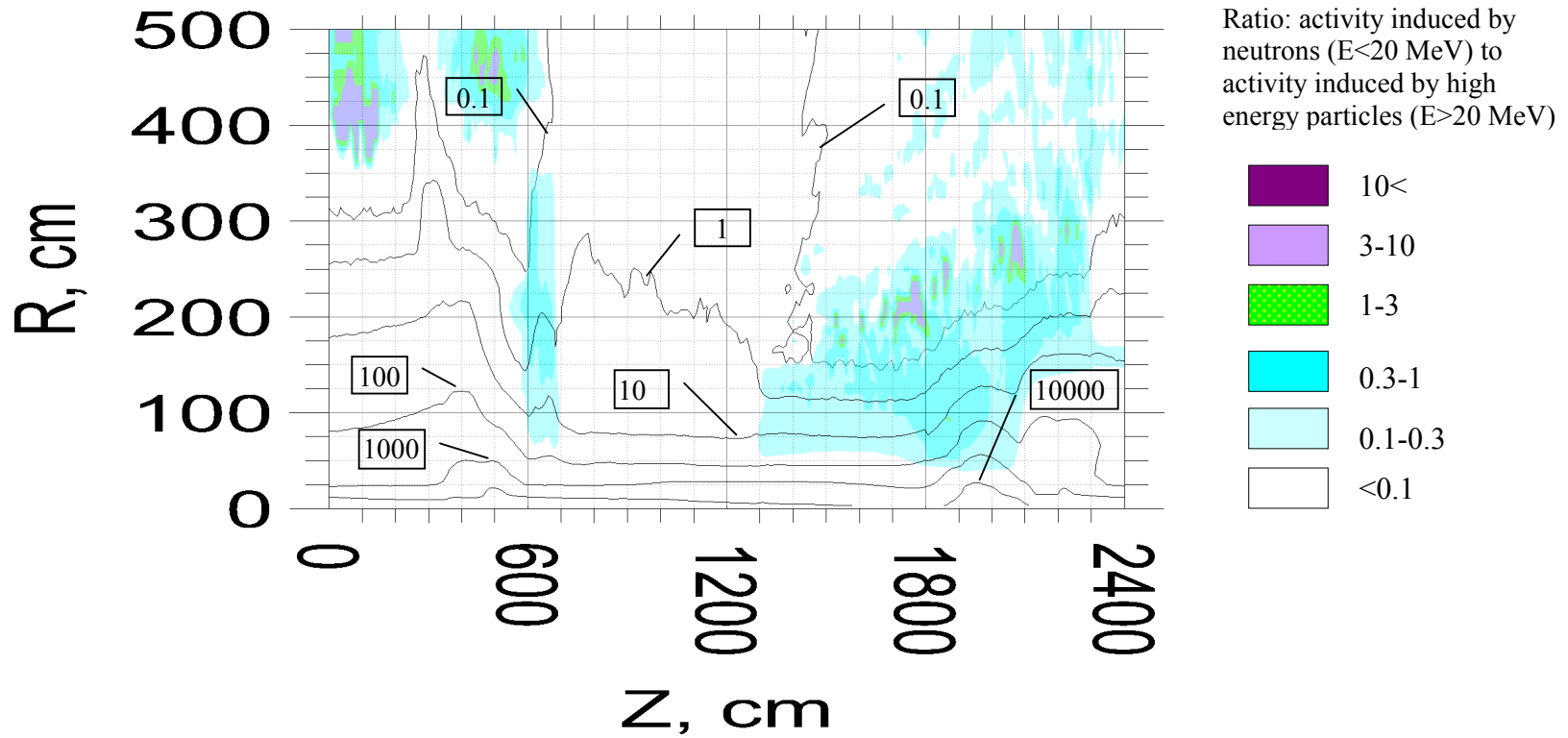


Fig .8. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=5d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 30 d

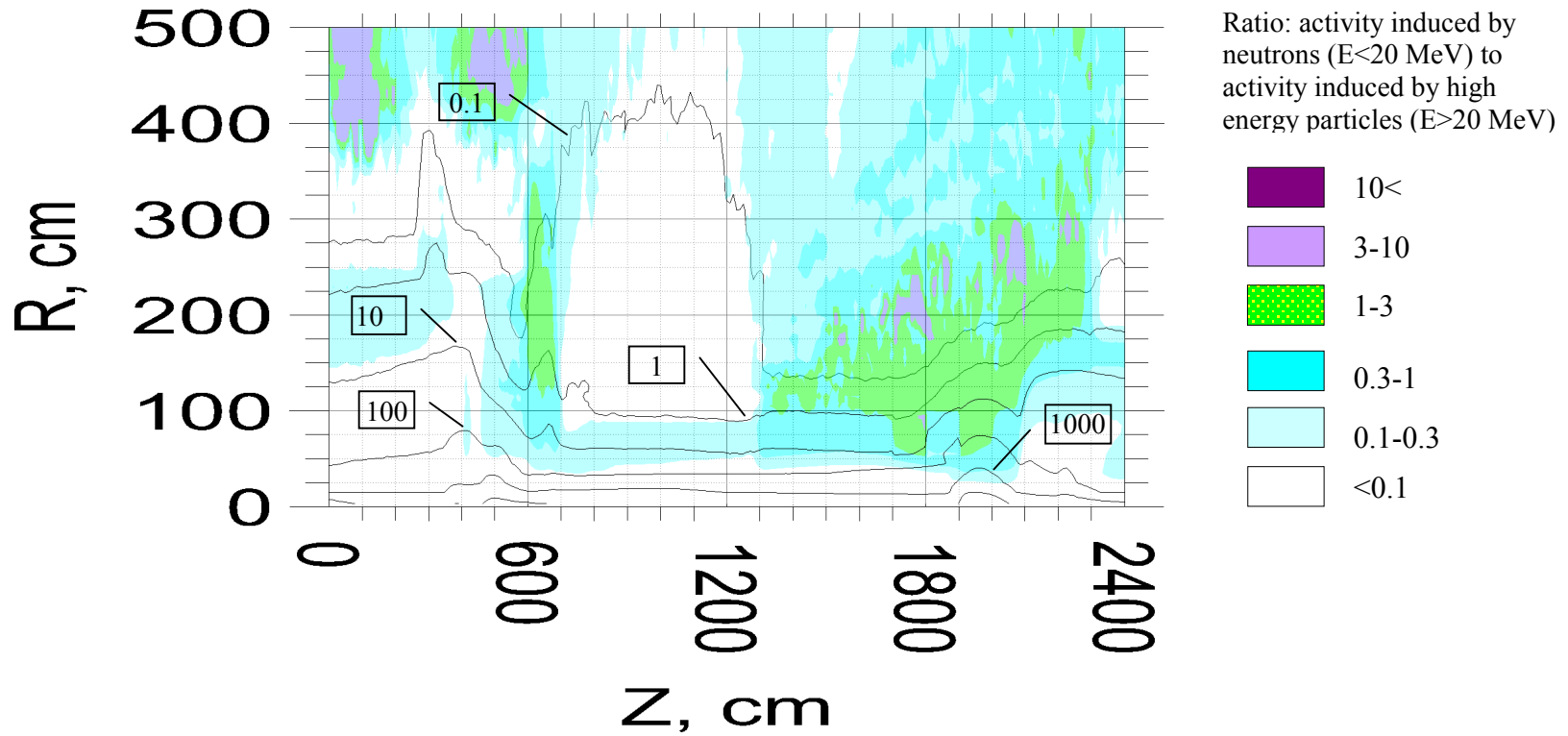


Fig .9. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=30d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 100 d

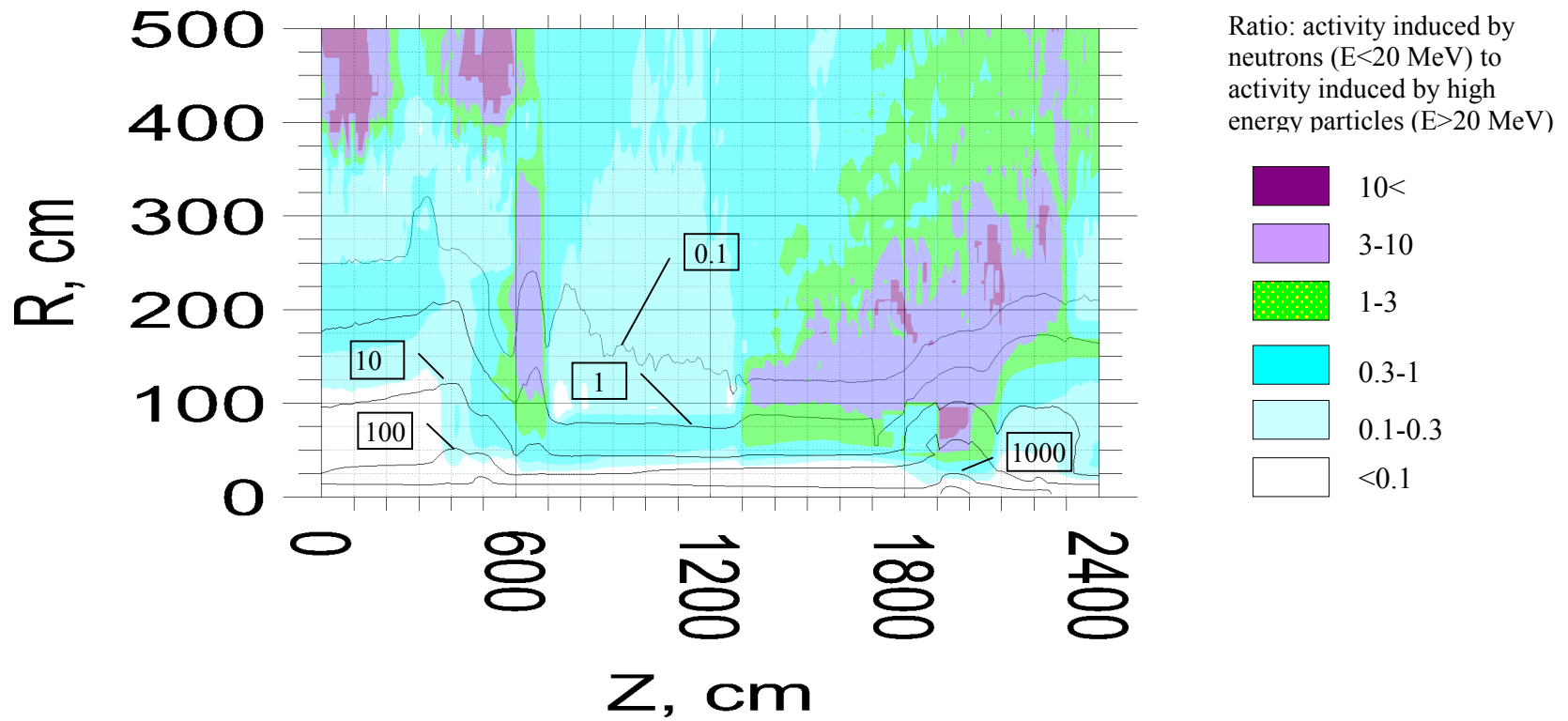


Fig .10. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=100d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 200 d

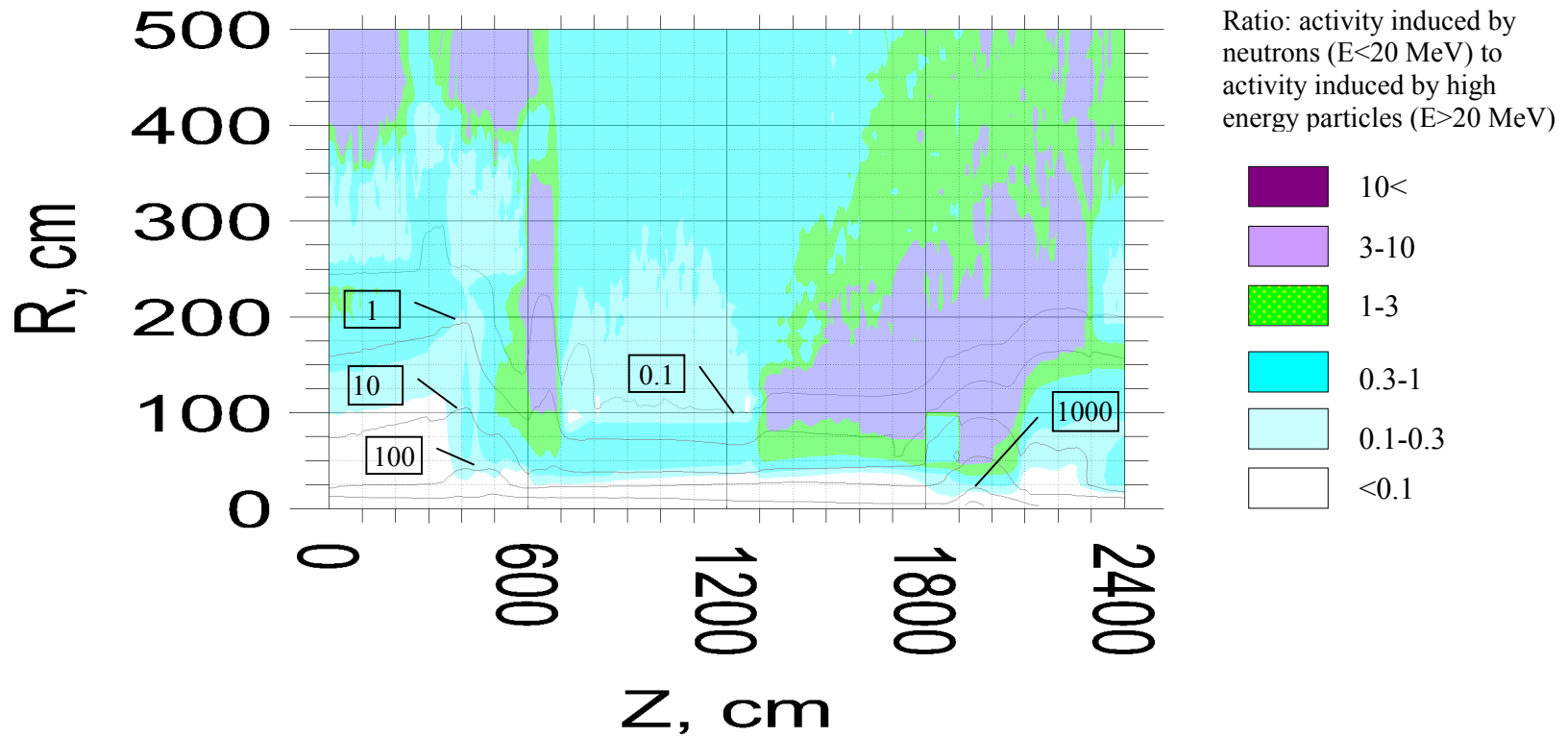


Fig .11. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=200d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Chemical Lead T=10 y, t= 2 y

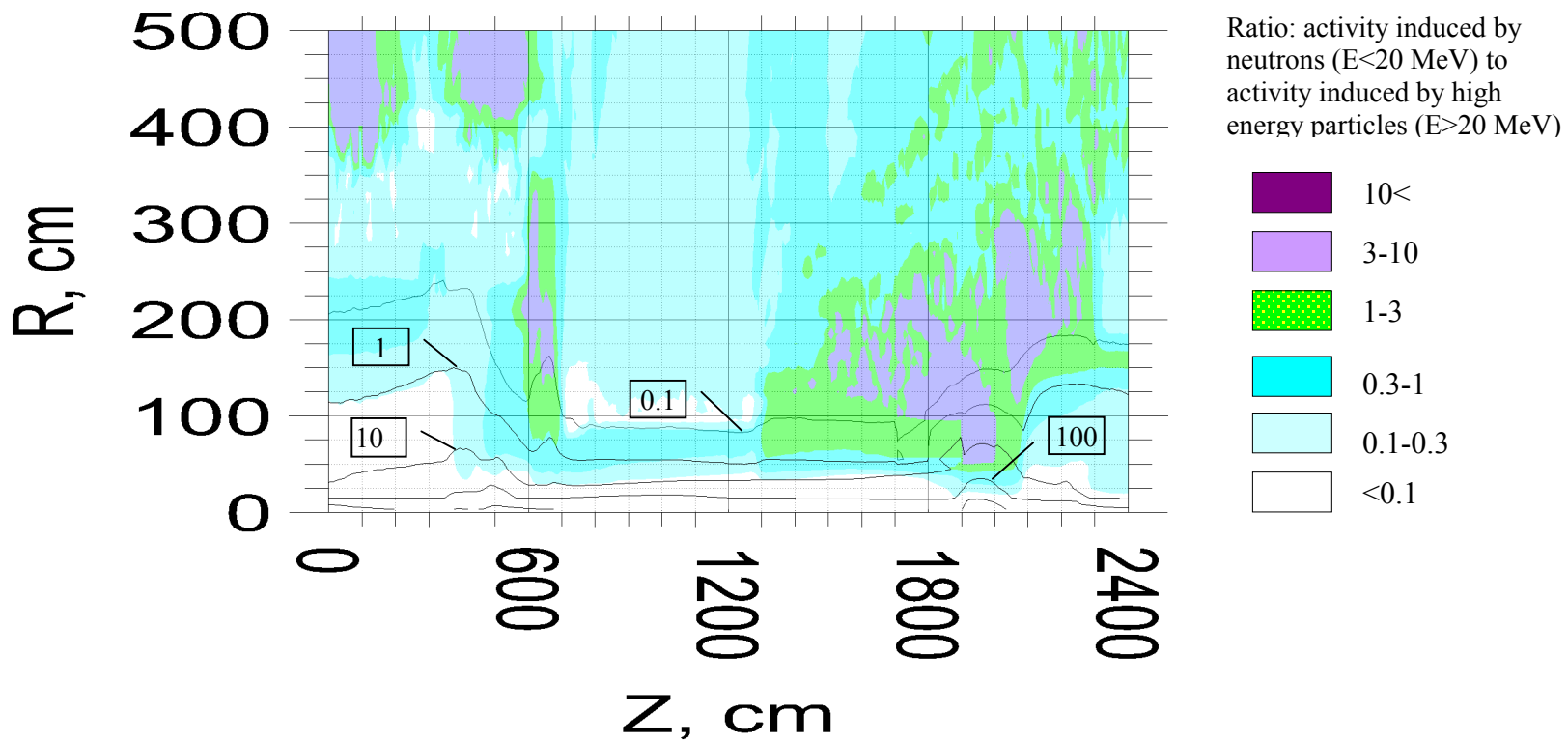


Fig .12. Distribution of induced radioactivity in Chemical Lead calculated at T=10y, t=2y. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=30d, t=1d

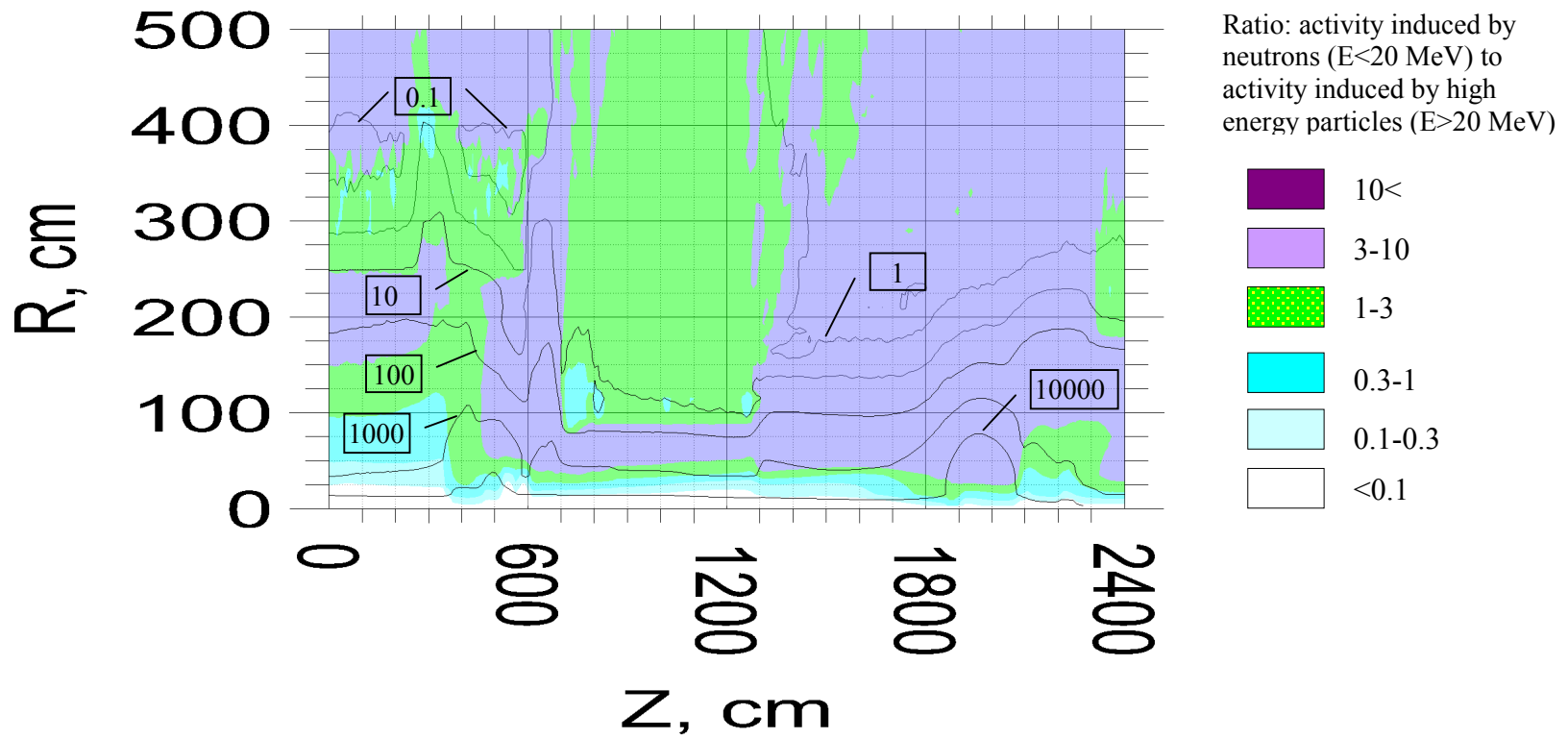


Fig .13. Distribution of induced radioactivity in Hard Lead calculated at T=30d, t=1d The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=30d, t=5d

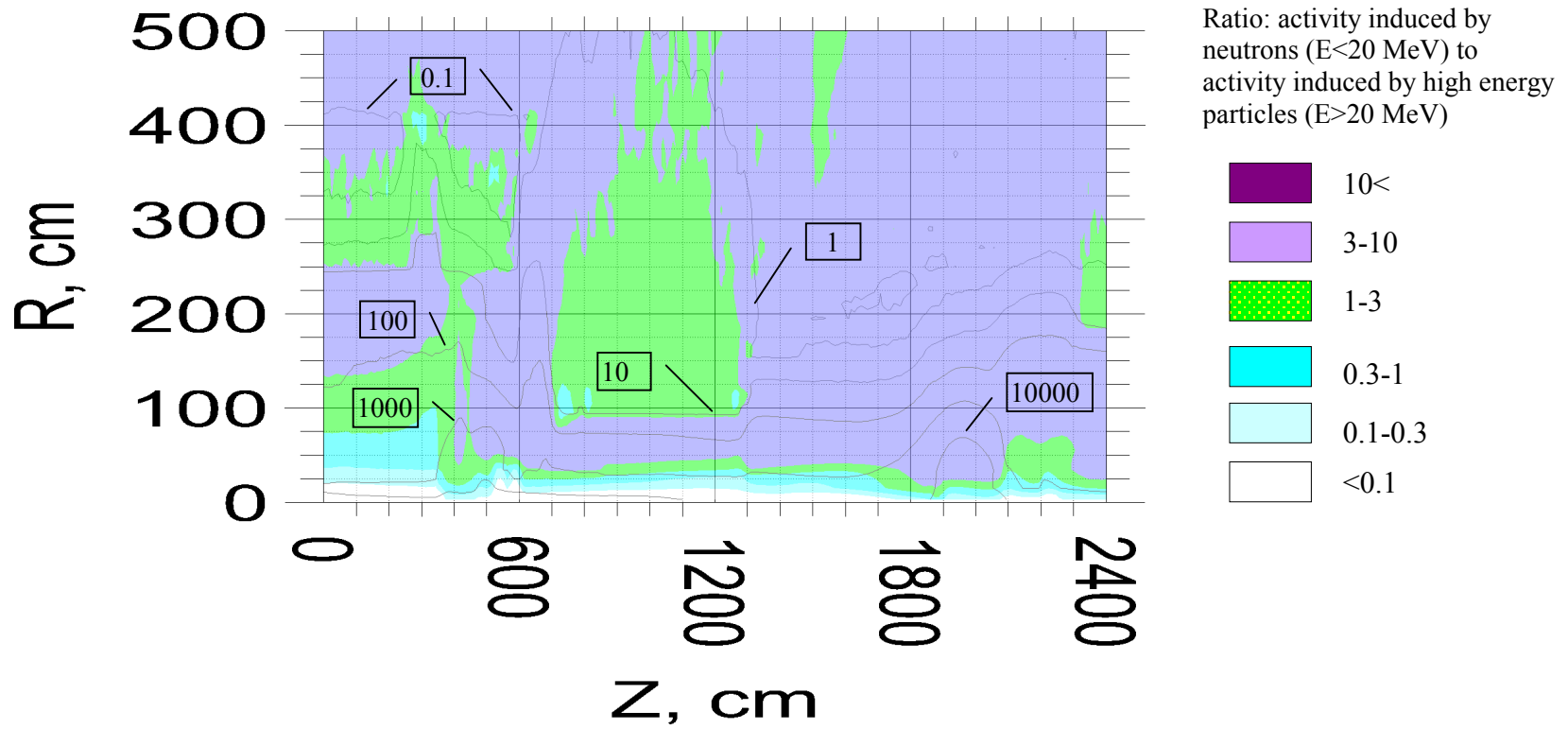


Fig .14. Distribution of induced radioactivity in Hard Lead calculated at T=30d, t=5d The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=100d, t=1d

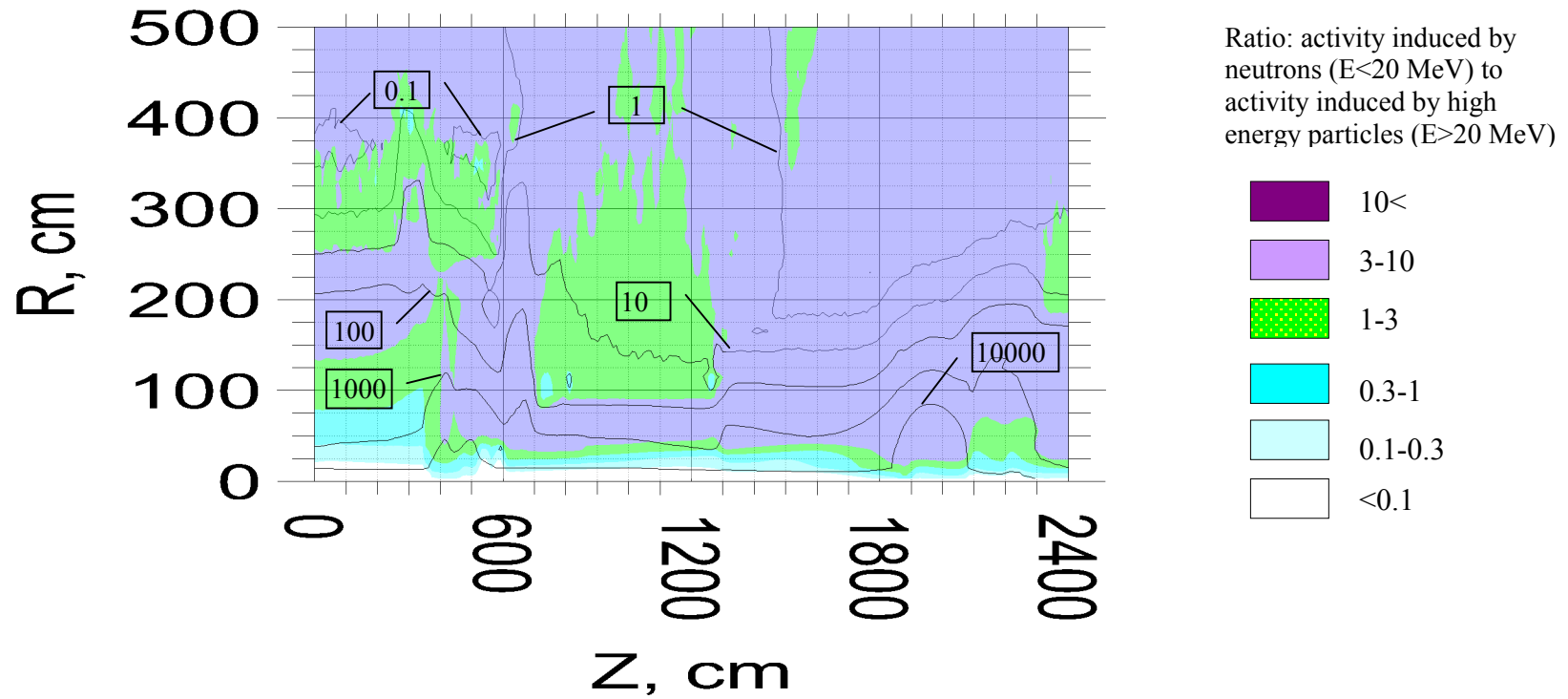


Fig .15. Distribution of induced radioactivity in Hard Lead calculated at T=100d, t=1d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=100d, t=5d

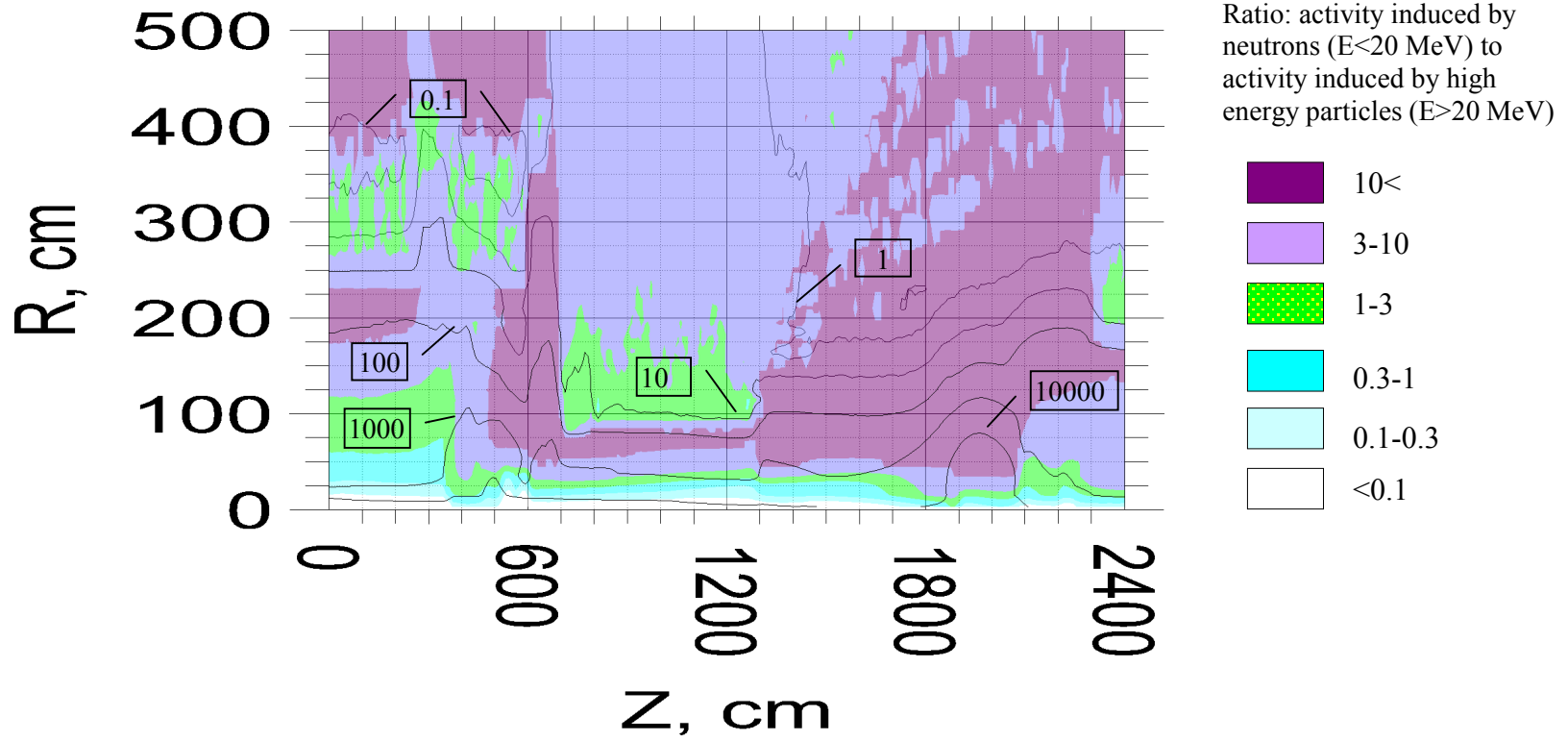


Fig .16. Distribution of induced radioactivity in Hard Lead calculated at T=100d, t=5d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=100d, t=30d

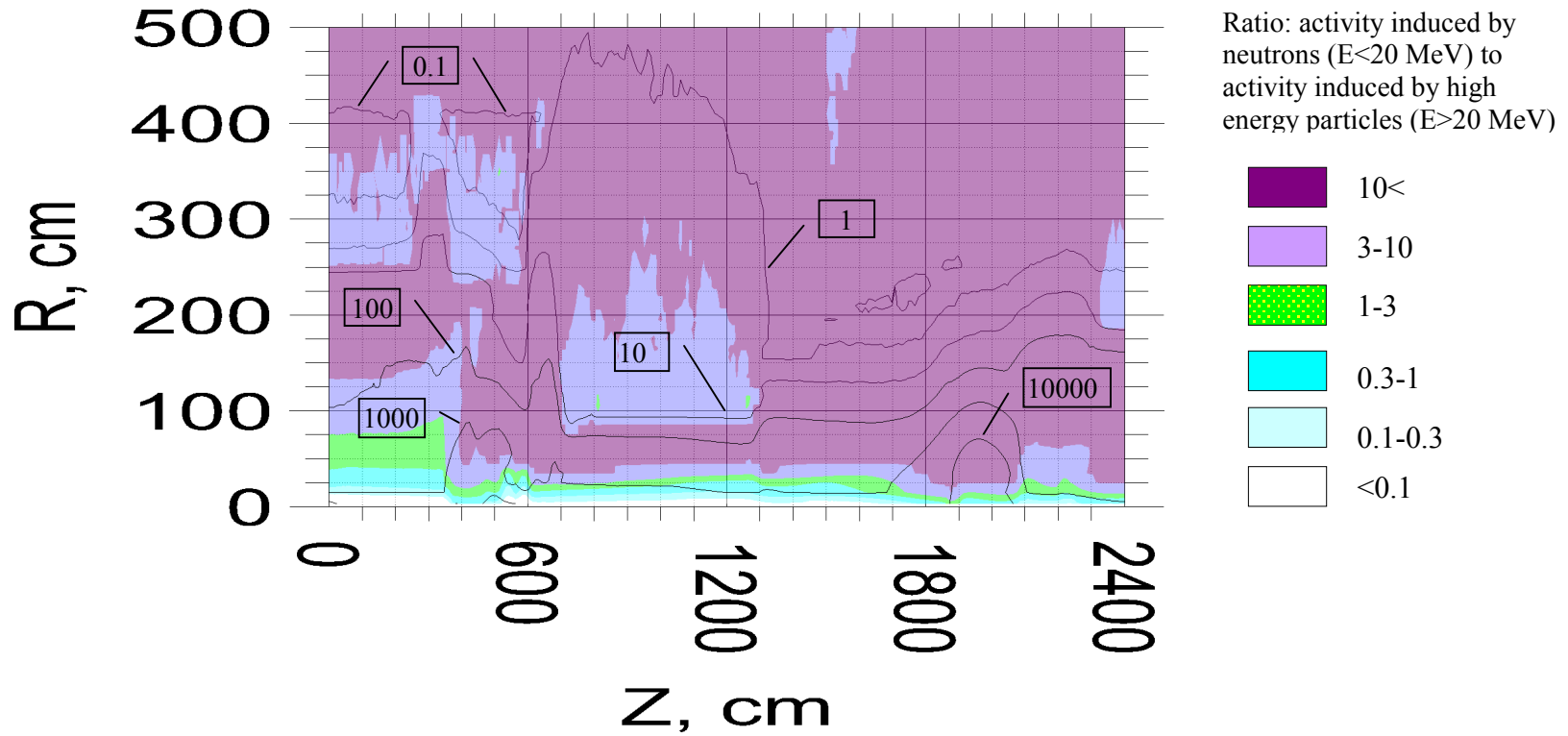


Fig .17. Distribution of induced radioactivity in Hard Lead calculated at T=100d, t=30d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=100d, t=100d

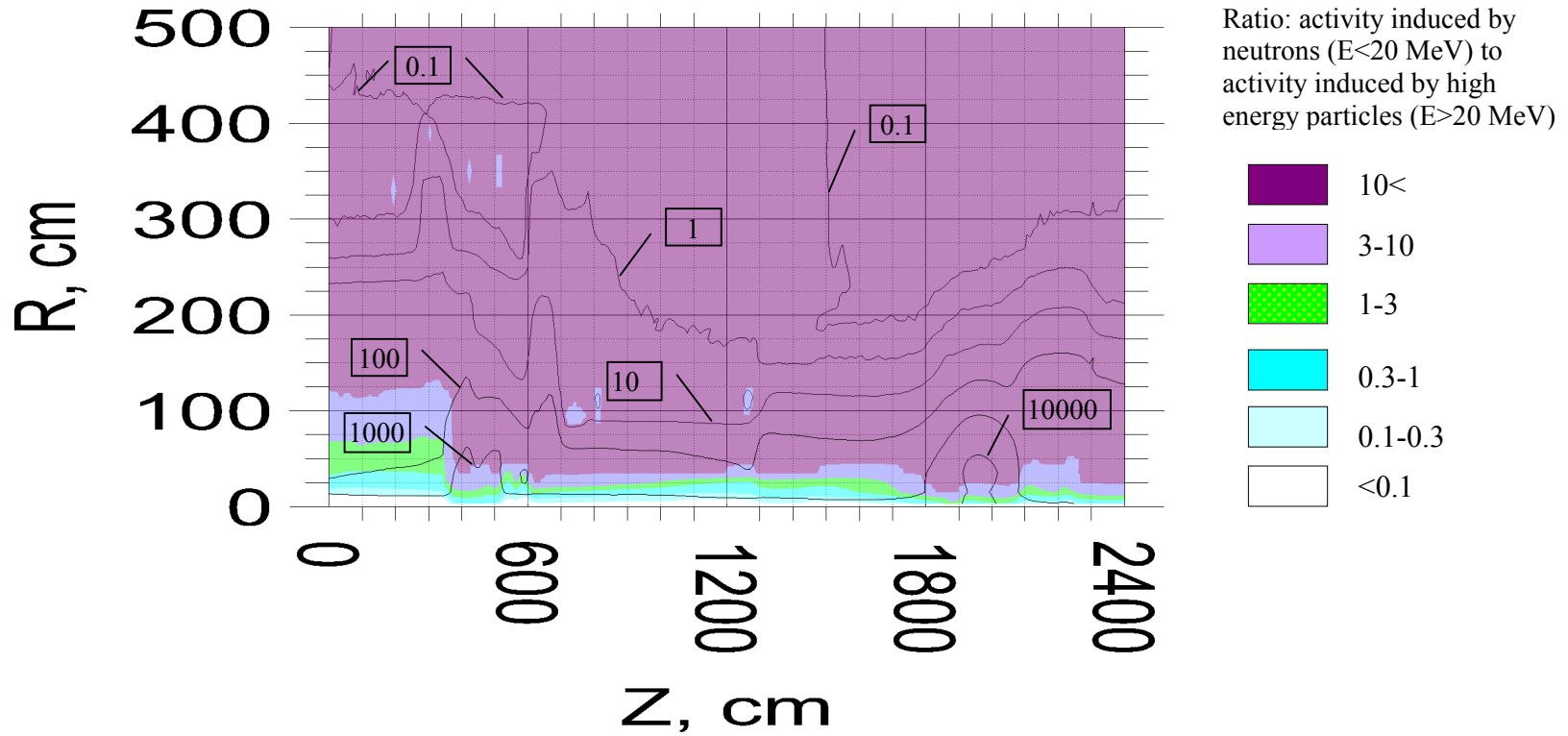


Fig .18. Distribution of induced radioactivity in Hard Lead calculated at T=100d, t=100d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t=1d

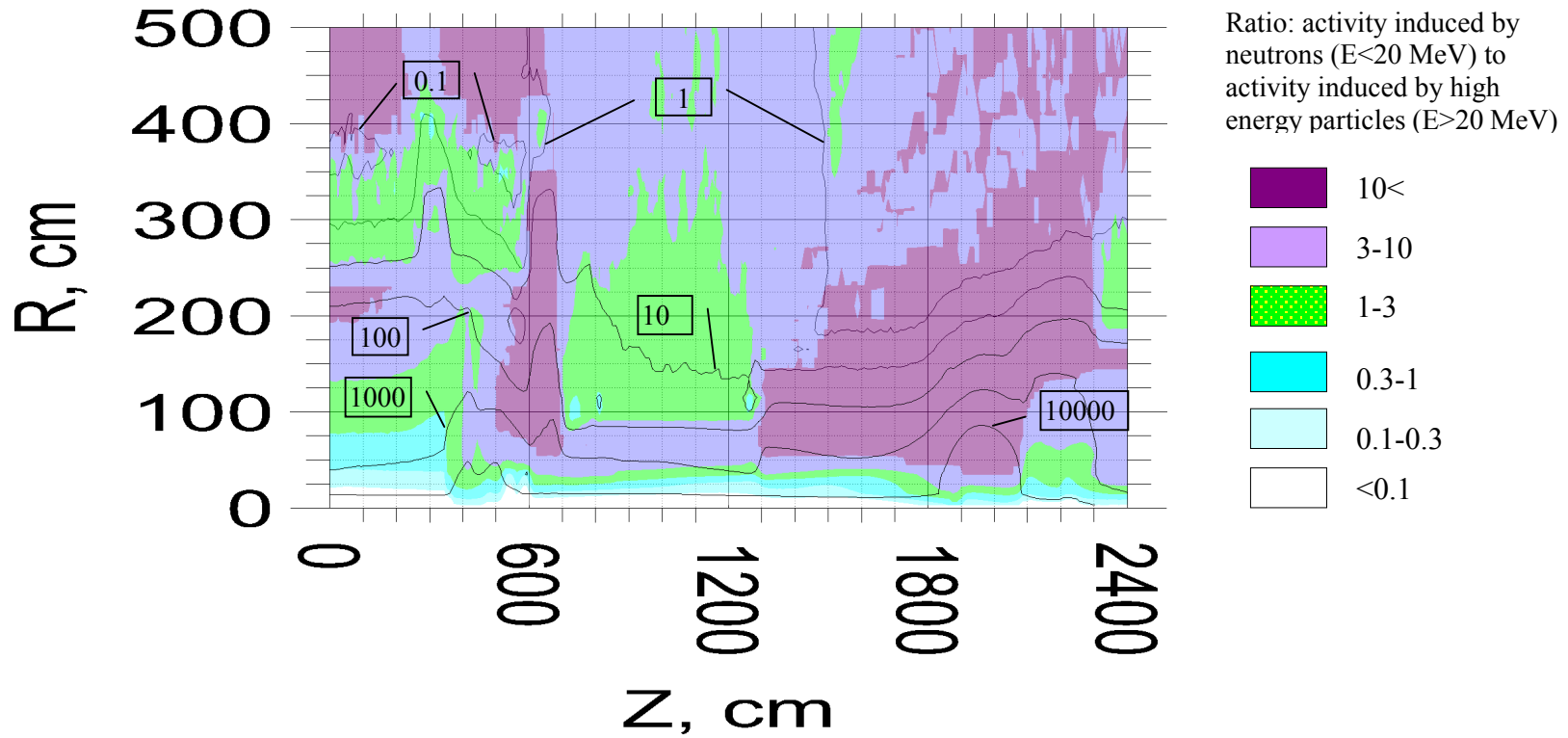


Fig .19. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=1d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t= 5 d

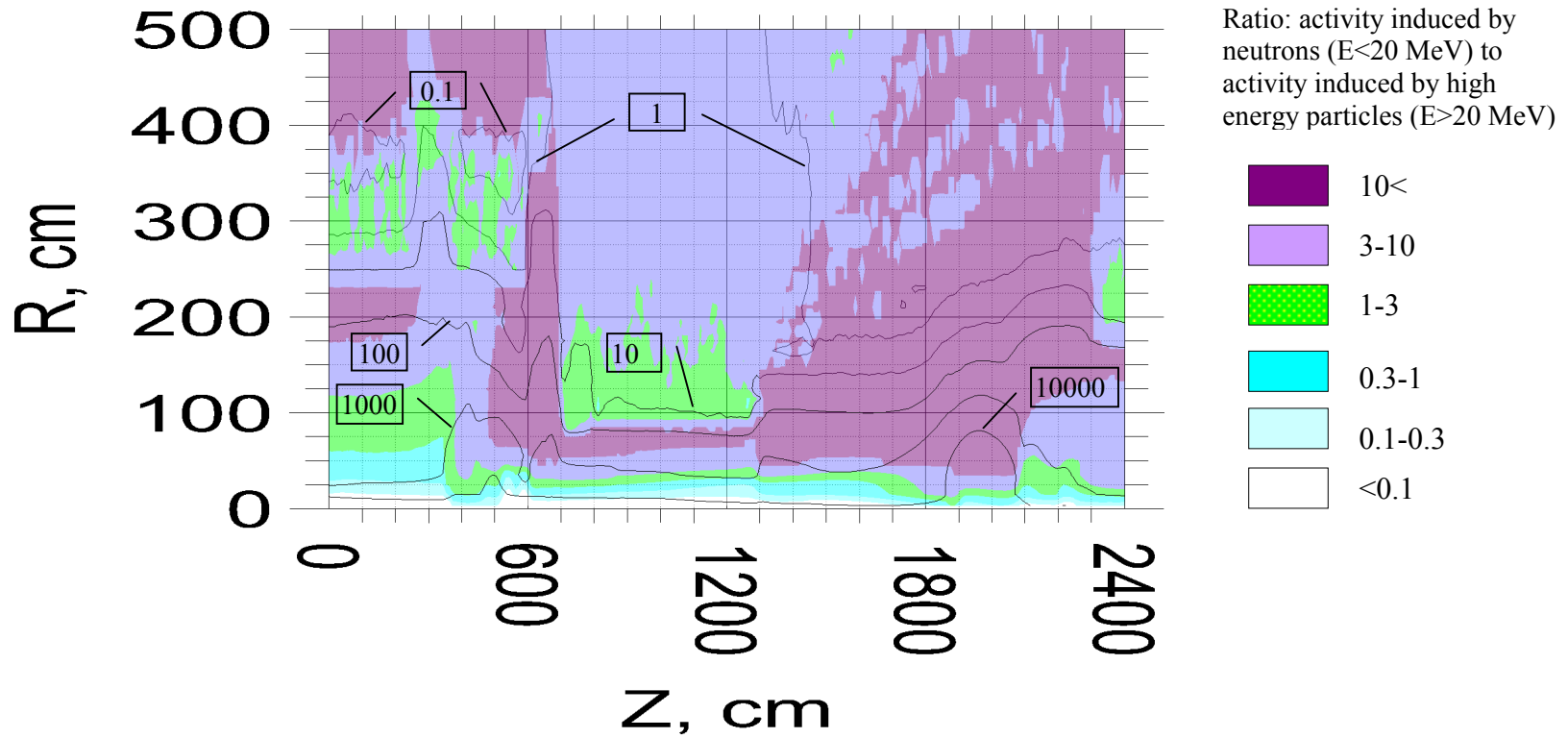


Fig .20. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=5d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t= 30 d

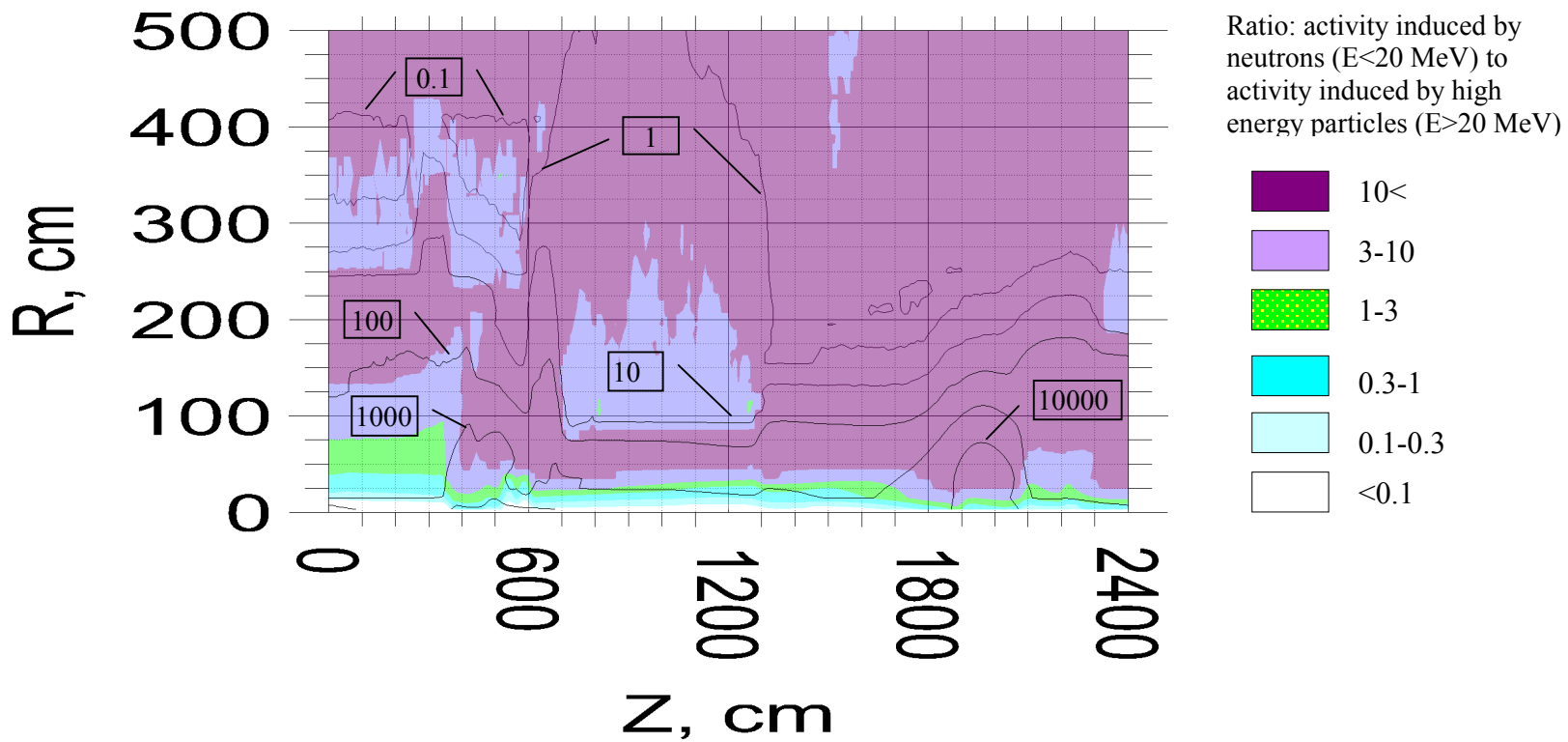


Fig .21. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=30d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t= 100 d

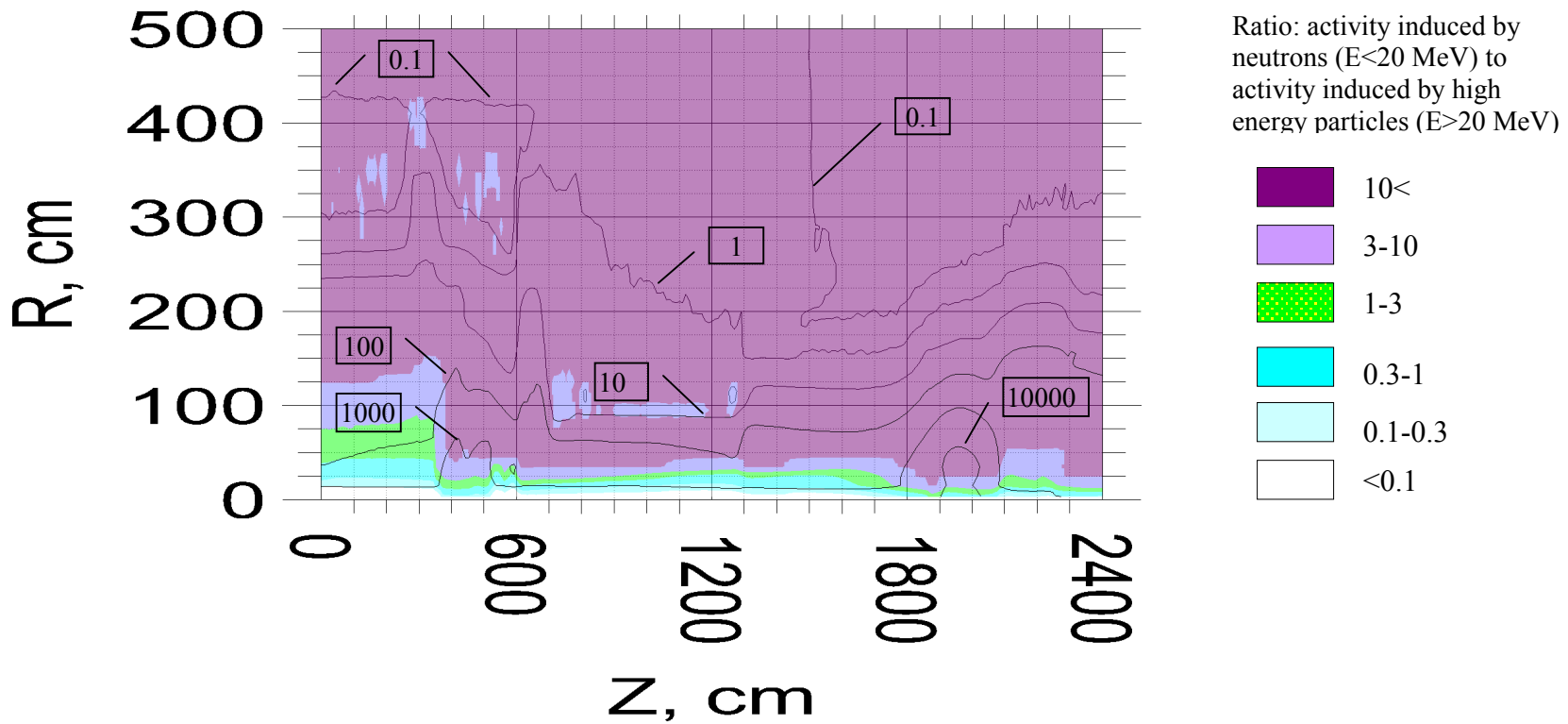


Fig .22. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=100d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t= 200 d

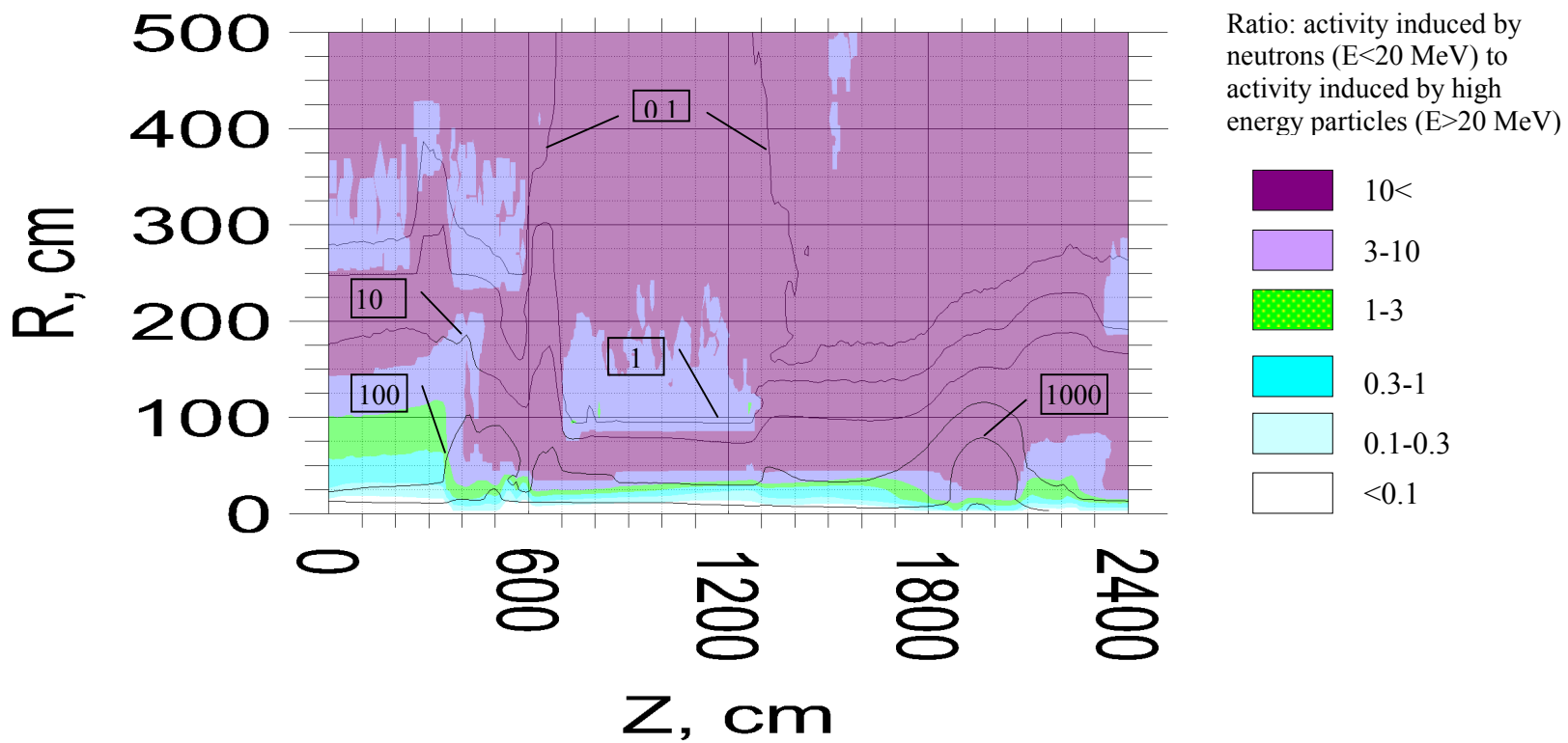


Fig .23. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=200d. The levels show contact dose rate in $\mu\text{Sv/h}$.

Hard Lead T=10 y, t= 2 y

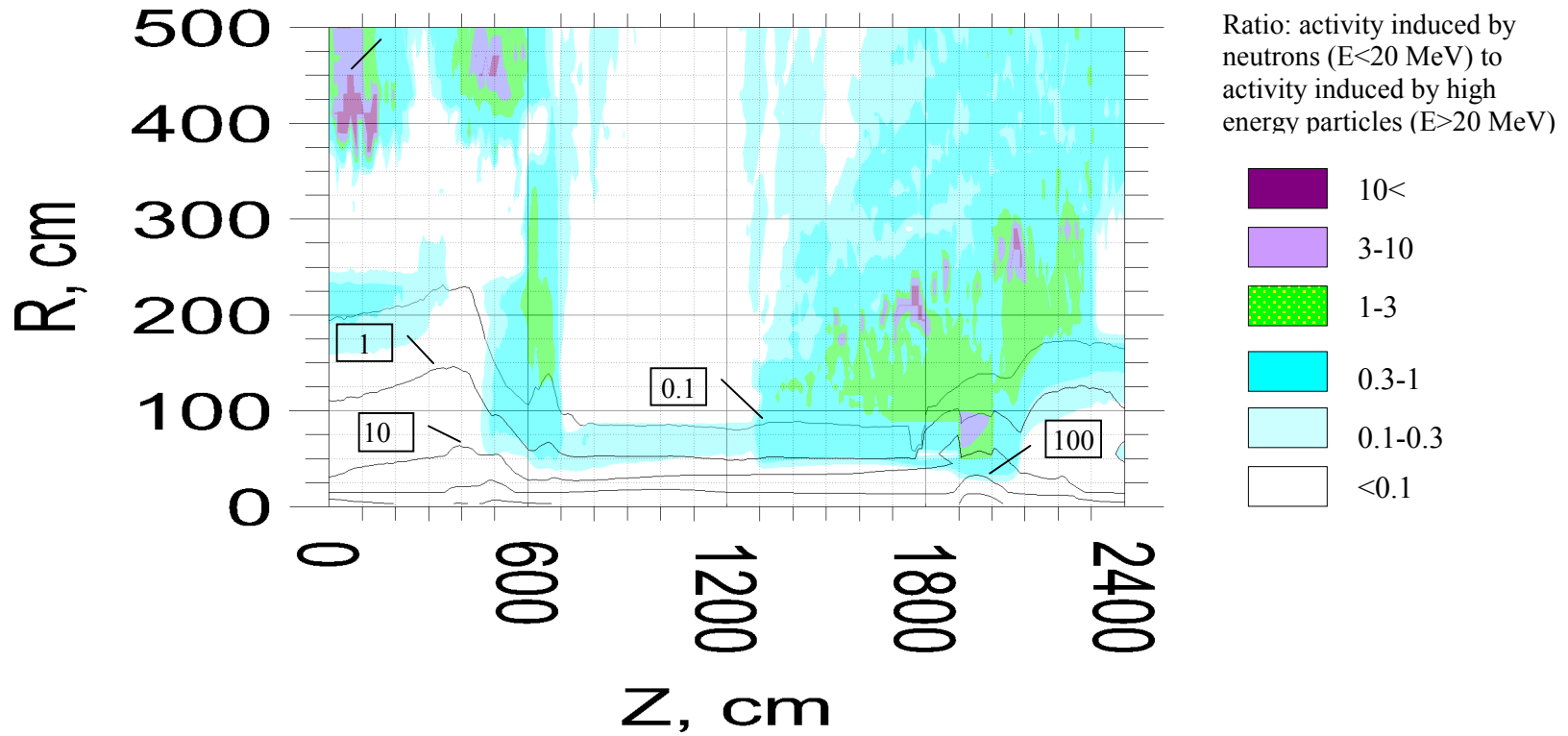


Fig .24. Distribution of induced radioactivity in Hard Lead calculated at T=10y, t=2y. The levels show contact dose rate in $\mu\text{Sv/h}$.