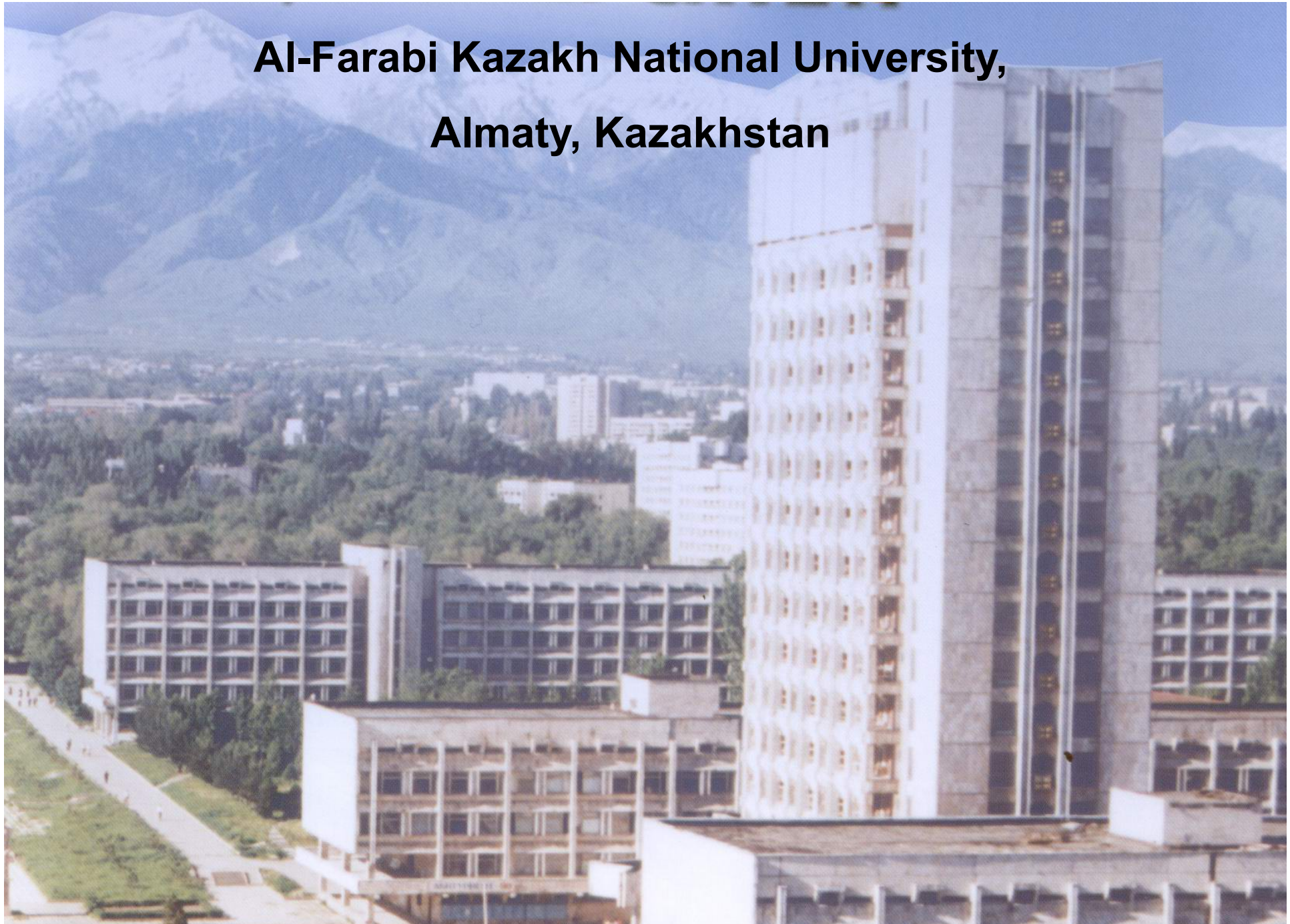
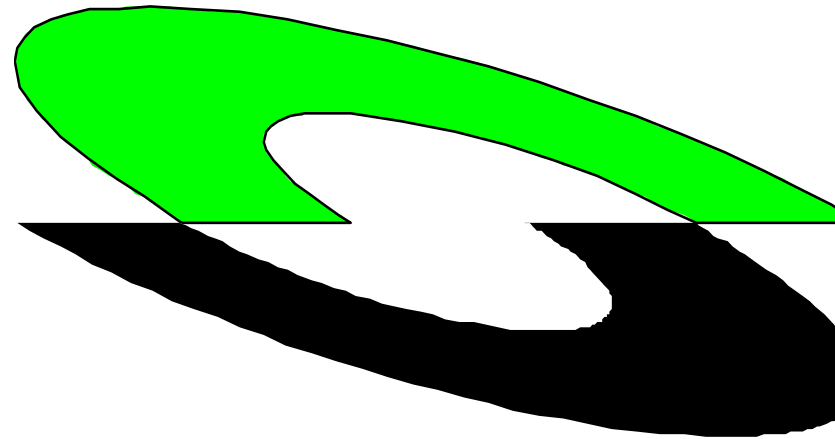


**Al-Farabi Kazakh National University,
Almaty, Kazakhstan**



I S T C

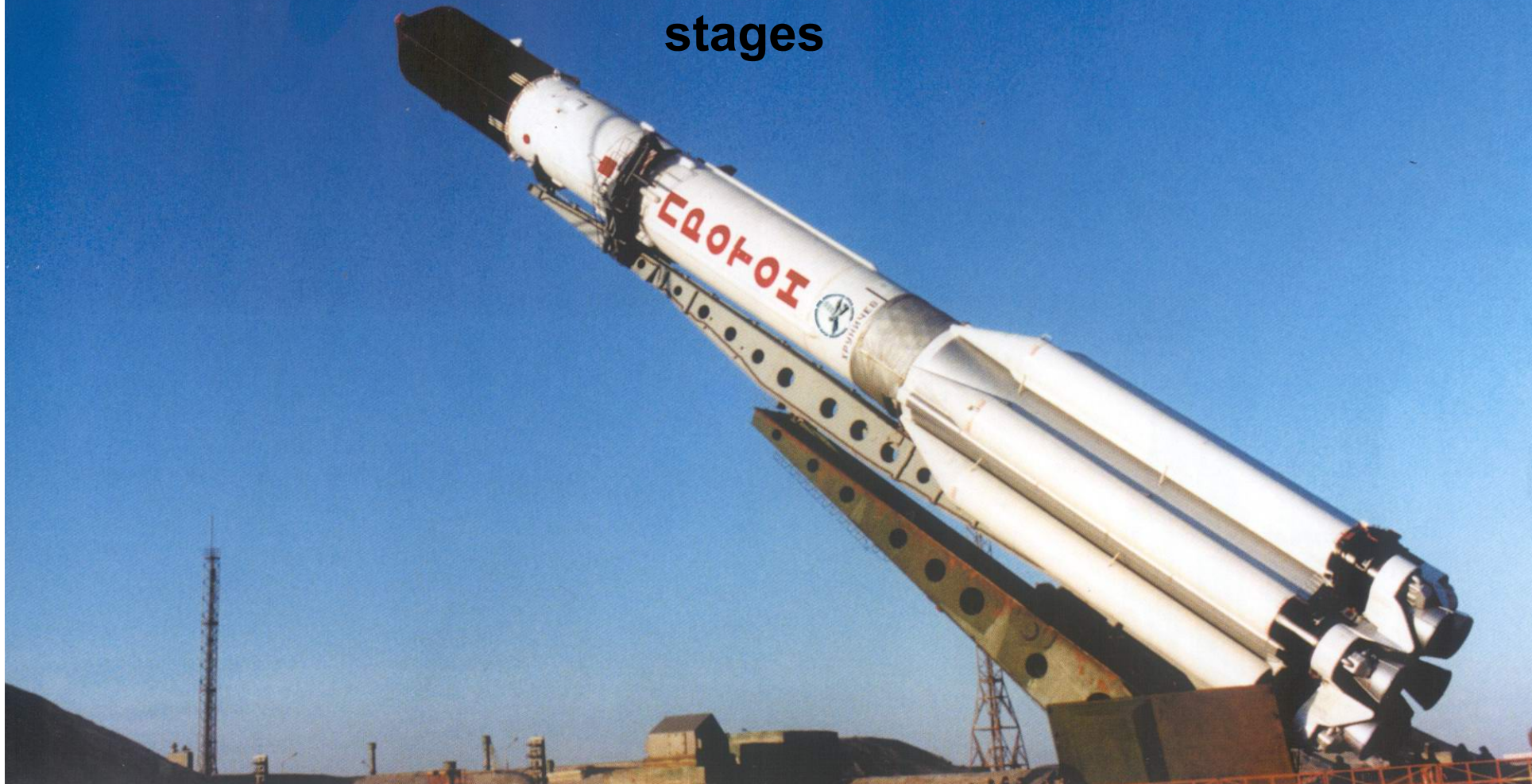


M H T U

K-451.2

System analysis of environmental objects in the territories of Kazakhstan which suffered negative influence through Baikonur space port activity

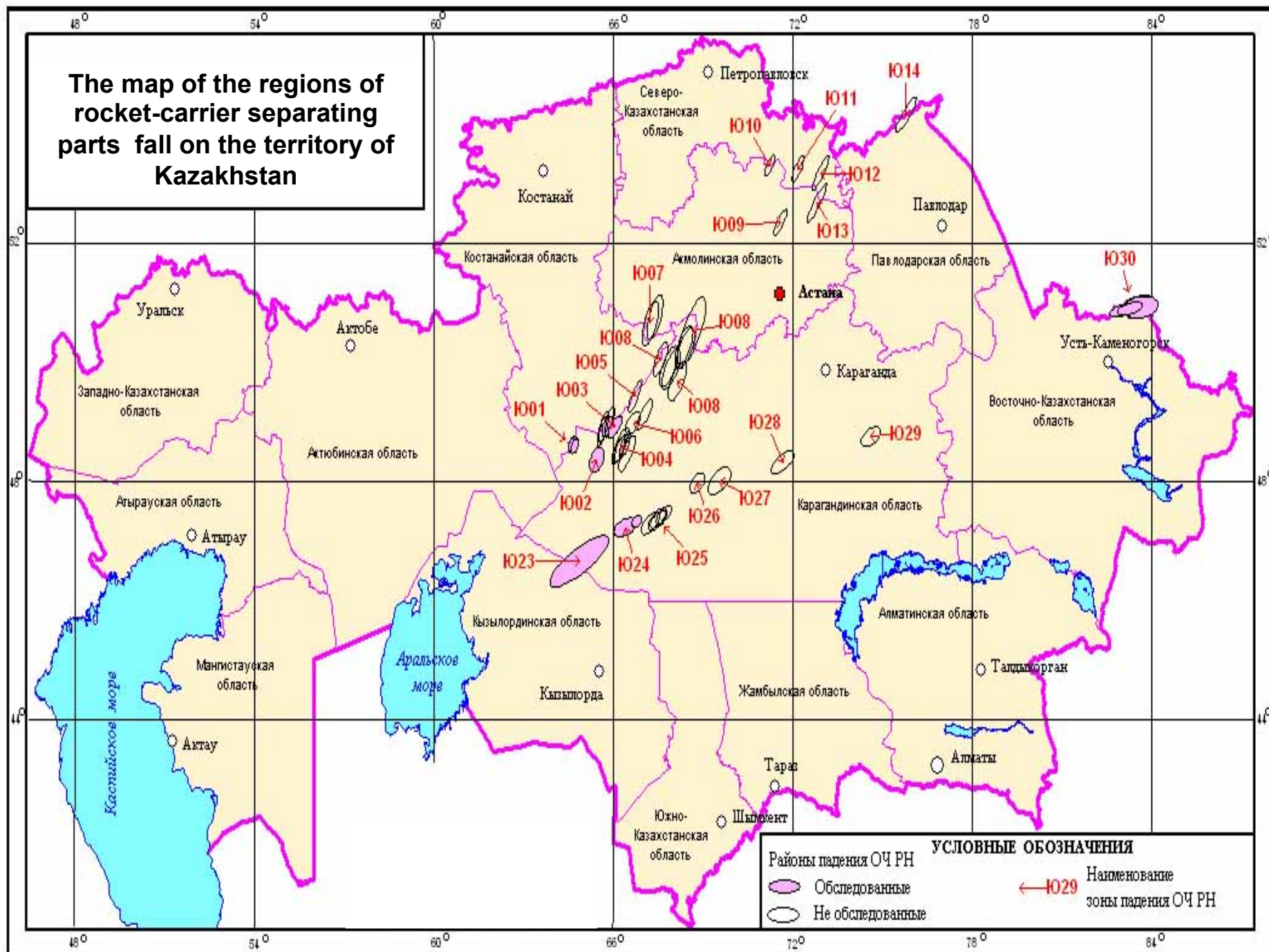
**Character of distribution of 1,1-dimethylhydrazine
concentration fields of fall places of rocket-carriers first
stages**



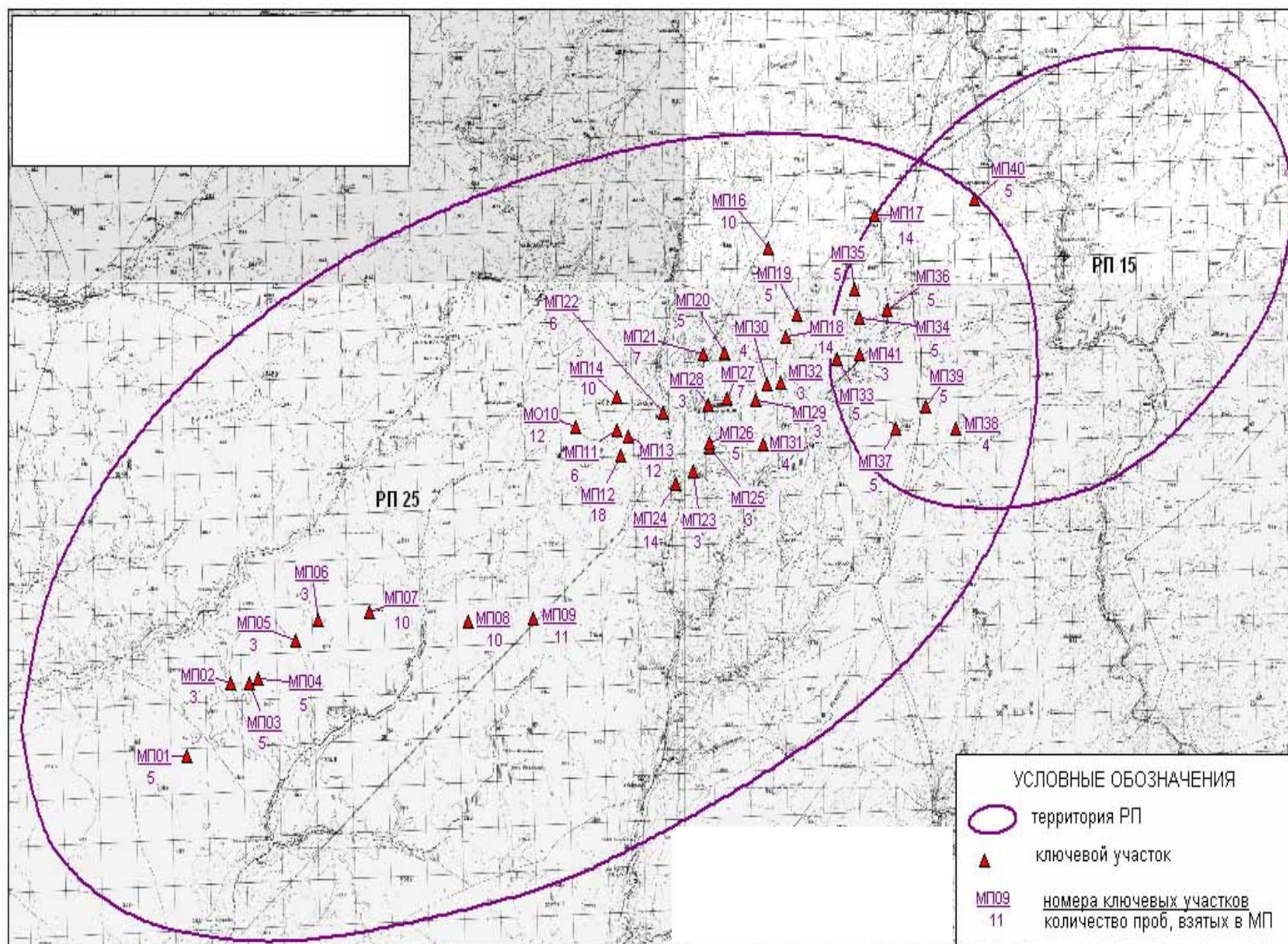
The main directions of investigations

- 1) Ecological-geochemical investigations on the state of the environment of the territories of rocket carriers first stages fall, which are contaminated with rocket fuel components;**
- 2) Creation of the database on the present-day state of the ecological system in the regions of fall of rocket carriers first stages;**
- 3) Laboratory investigations of 1,1-dimethylhydrazine effect on biological properties of plant and animal organisms**
- 4) The development of the methods for increasing the stability of cell membranes with the help of biologically active compounds;**
- 5) Estimation of the damage and working out of recommendations for remediation of contaminated lands;**
- 6) Bioremediation of the soils of Kazakhstan contaminated with 1,1 DMH due to launching of rockets from the cosmodrome “Baikonur”;**
- 7) The development of the information centre of the cosmodrome “Baikonur”,**
- 8) The analysis of legal regimes of using the territories of the fall regions granted on lease for the rocket-space activity.**

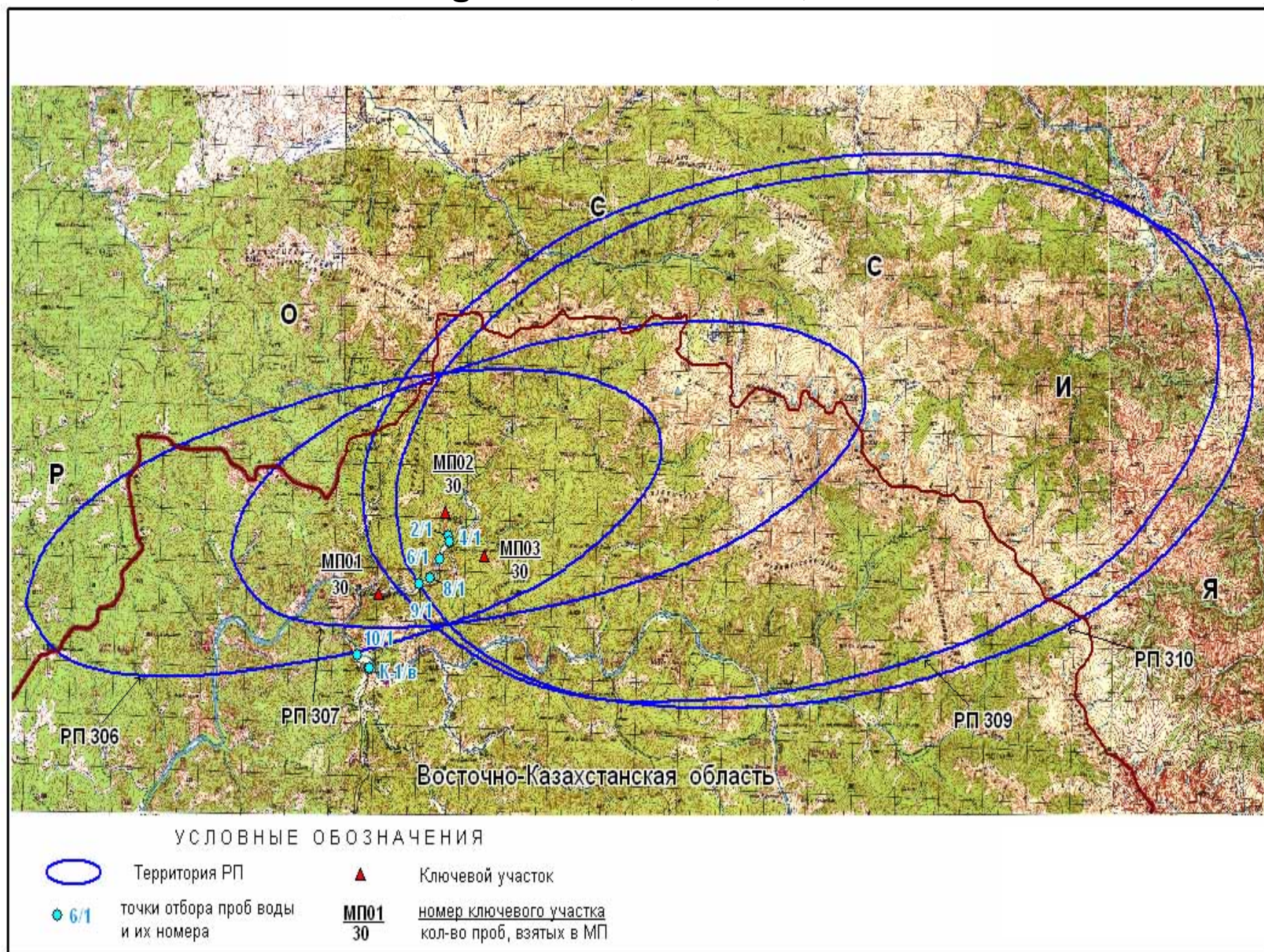
**The map of the regions of
rocket-carrier separating
parts fall on the territory of
Kazakhstan**



Fall region 25,15



Fall regions 306, 307, 309, 310

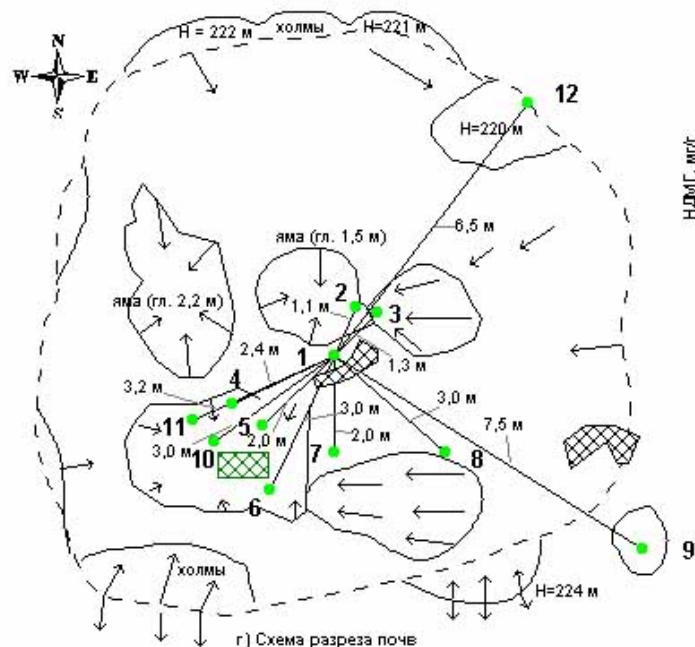


Rocket-carrier “Proton” residues

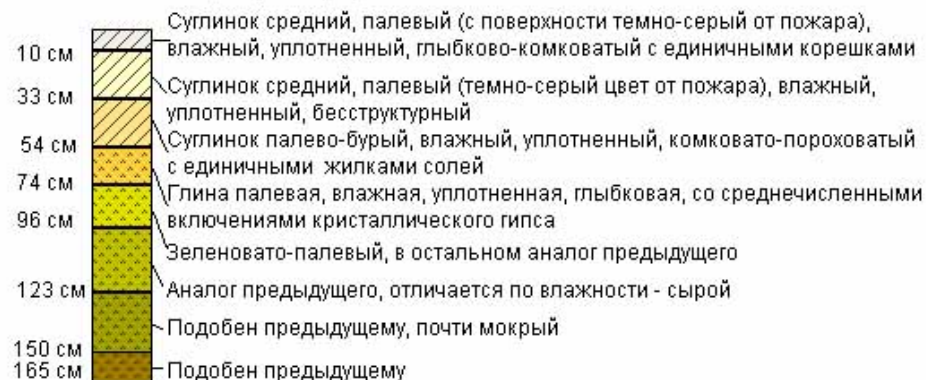


Characteristics of key site fall place 52 of fall region 148

а) Схема ключевого участка с расположением точек отбора проб



г) Схема разреза почв

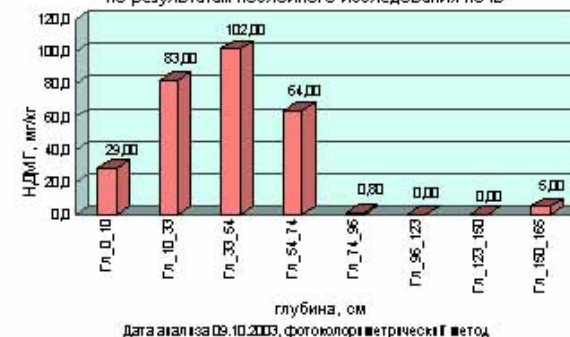


б) Гистограмма концентраций НДМГ



Дата анализа 09.10.2003, фотокolorиметрический метод

в) Гистограмма концентраций НДМГ по результатам послойного исследования почв



Дата анализа 09.10.2003, фотокolorиметрический метод

| | | | |
|--------------|-------------|------------------------------|------------------------------------|
| Тип РН | Протон | Координаты центральной точки | 48 18 18,2 с.ш. 65 27 15,2 в.д. |
| Вид ОЧРН | 1-я ступень | Высота центр. точки | 222 м |
| Дата падения | 30.11.2000 | Дата отбора проб | 24.06.2003 |
| Объект ОС | почва | Кол-во проб | поверхность: 12 |
| | | шурф | 8 |

| УСЛОВНЫЕ ОБОЗНАЧЕНИЯ | | | |
|----------------------|-------------------------|---|-------------------------------|
| ● 5 | Точки отбора проб | ▣ | Места с фрагментами ОЧ РН |
| ○ | Условный контур участка | ▤ | Место заложения шурфа |
| | | → | Направление понижения рельефа |

A crater on rocket-carrier “Proton” fall place



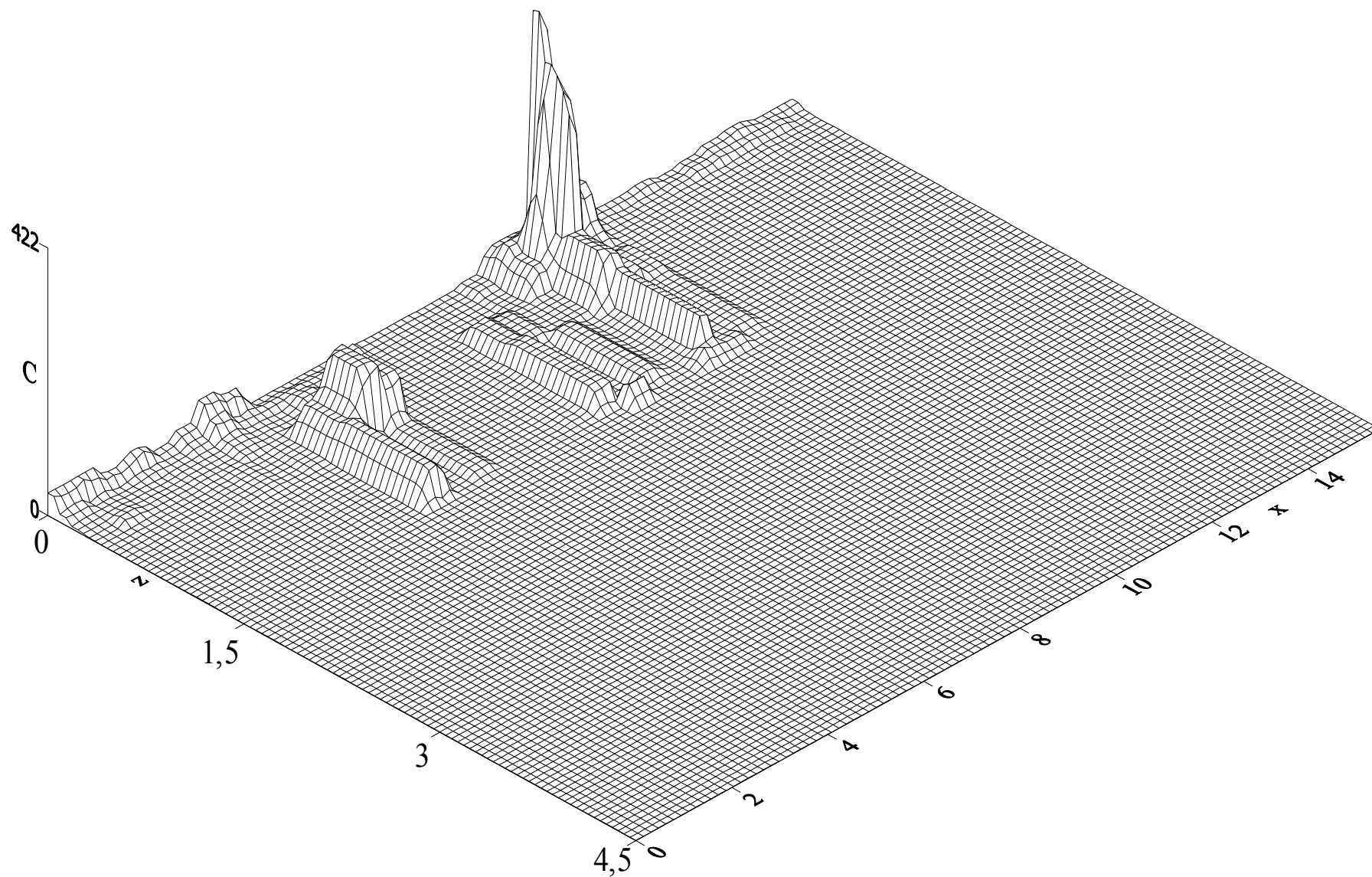
Layer sampling in the pit section at fall place



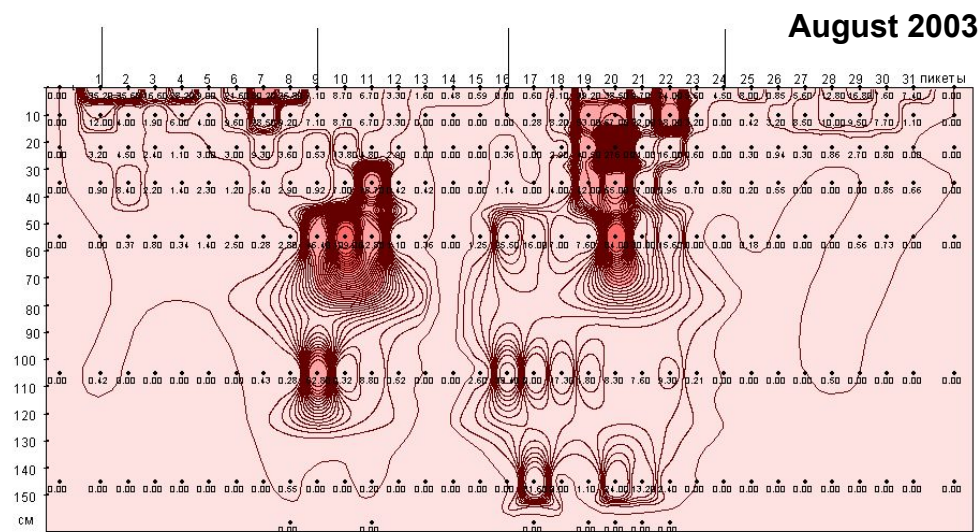
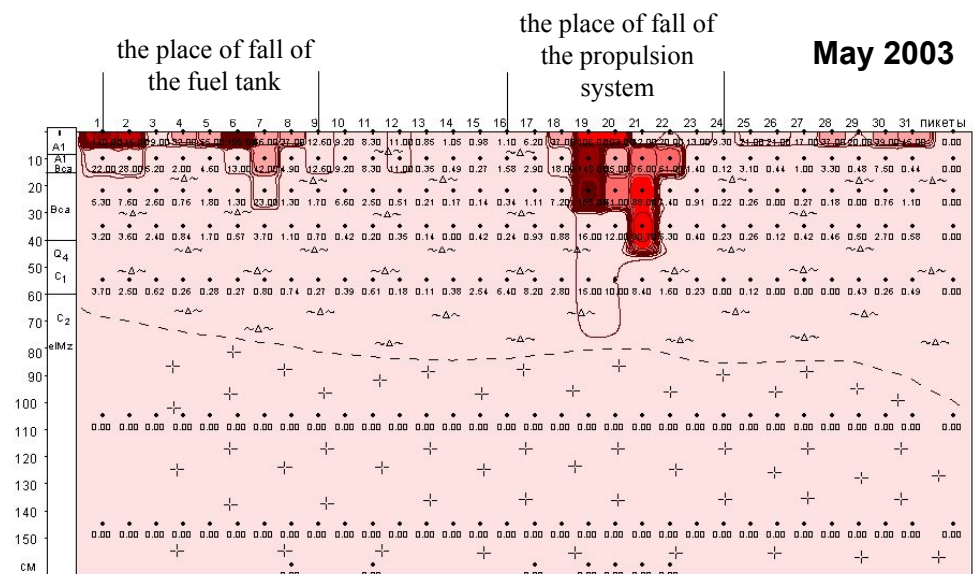
The section on the fall place in fall region 25,15



Distribution of 1,1-DMH in the soil thickness



The scheme of 1,1-DMH distribution in the soil profile of rocket-carrier “Proton” fall place

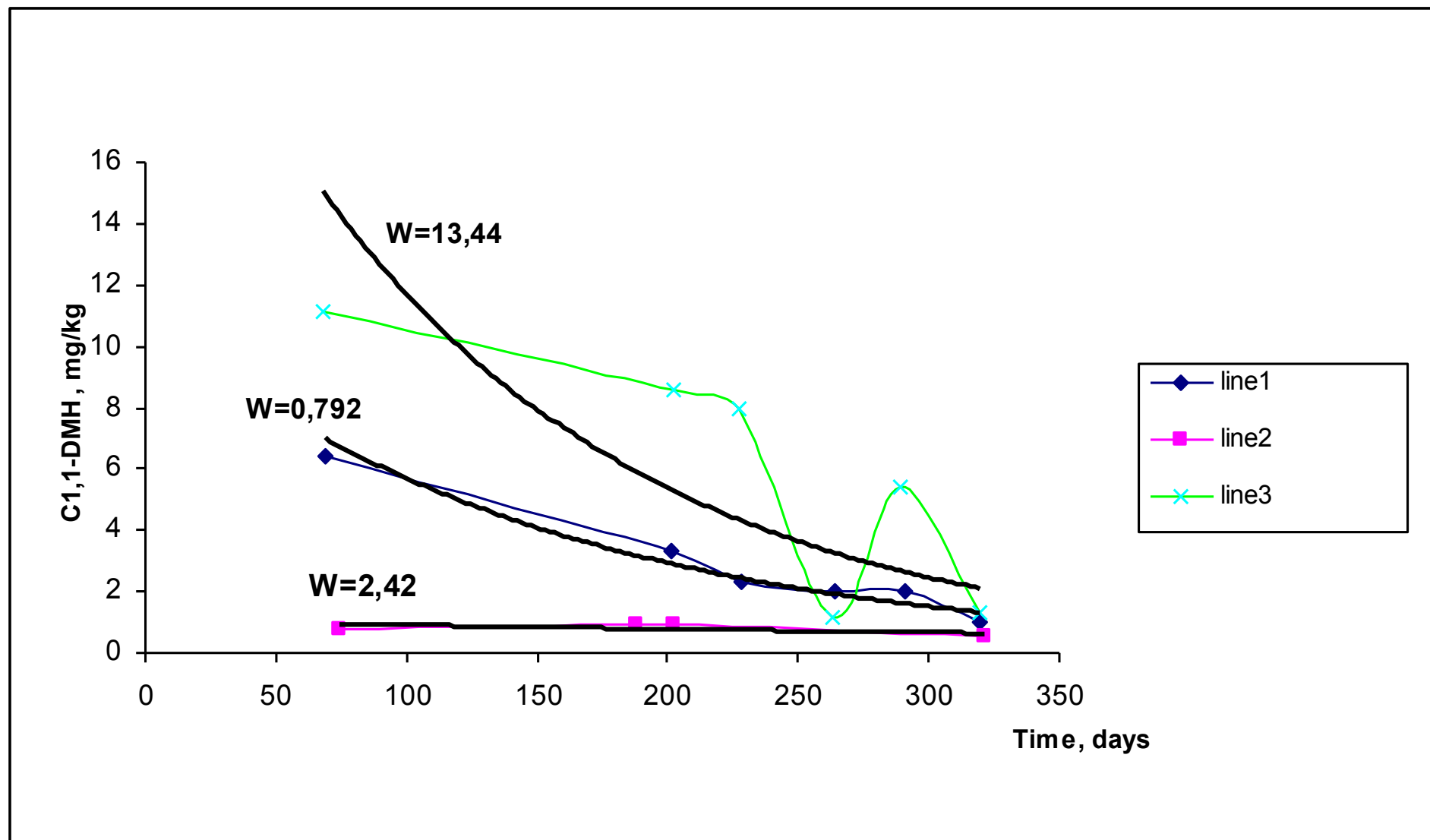


Content of 1,1-DMH, mg/kg

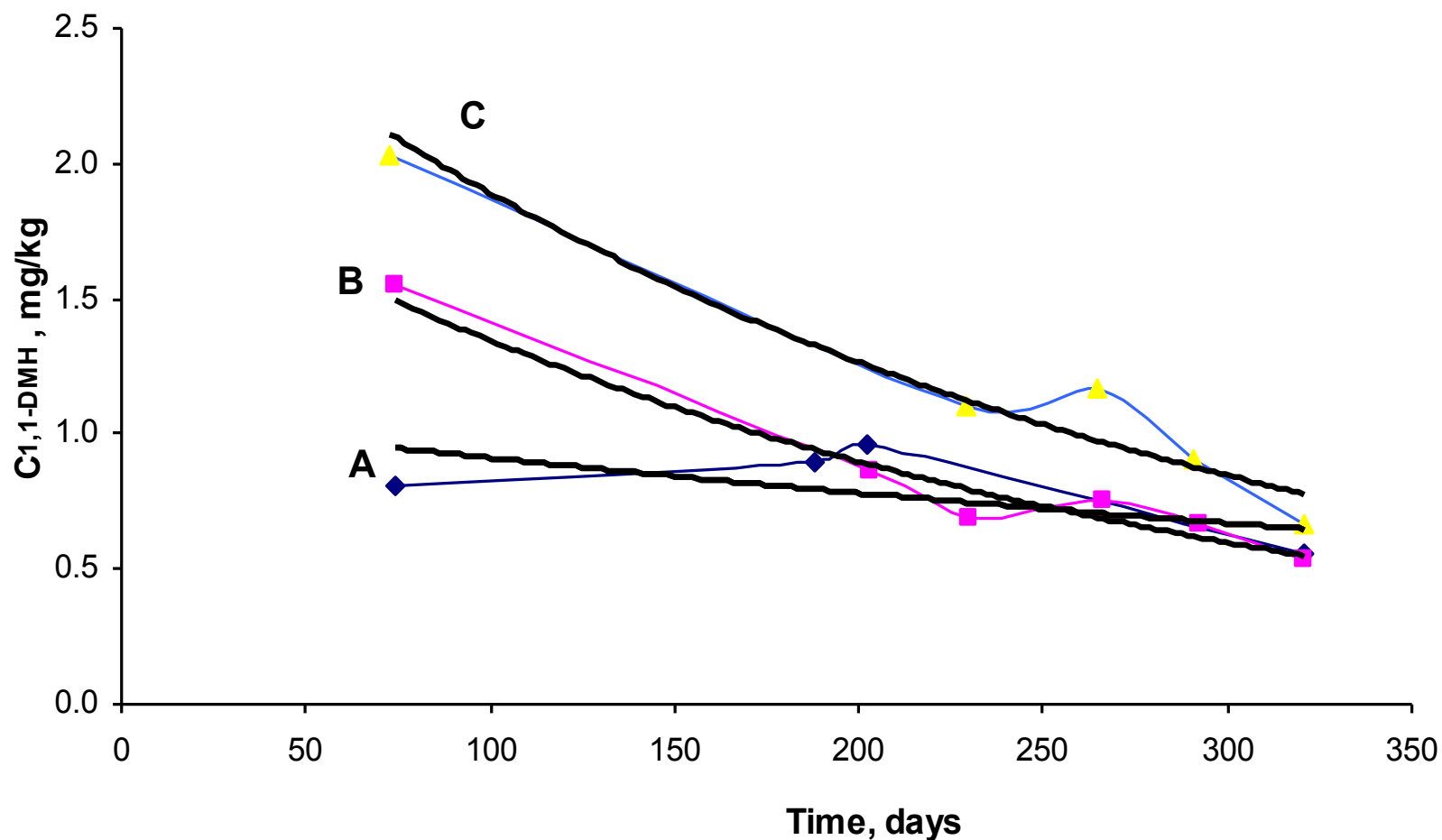
~ ~ ~ loam with detritus
+ + + grass crust of weathering



Kinetic curve of the dependency of 1,1-DMH destruction process on the value of soil humidity



Kinetic curve of the dependency of 1,1-DMH destruction process on the type of soil (A, B, C)

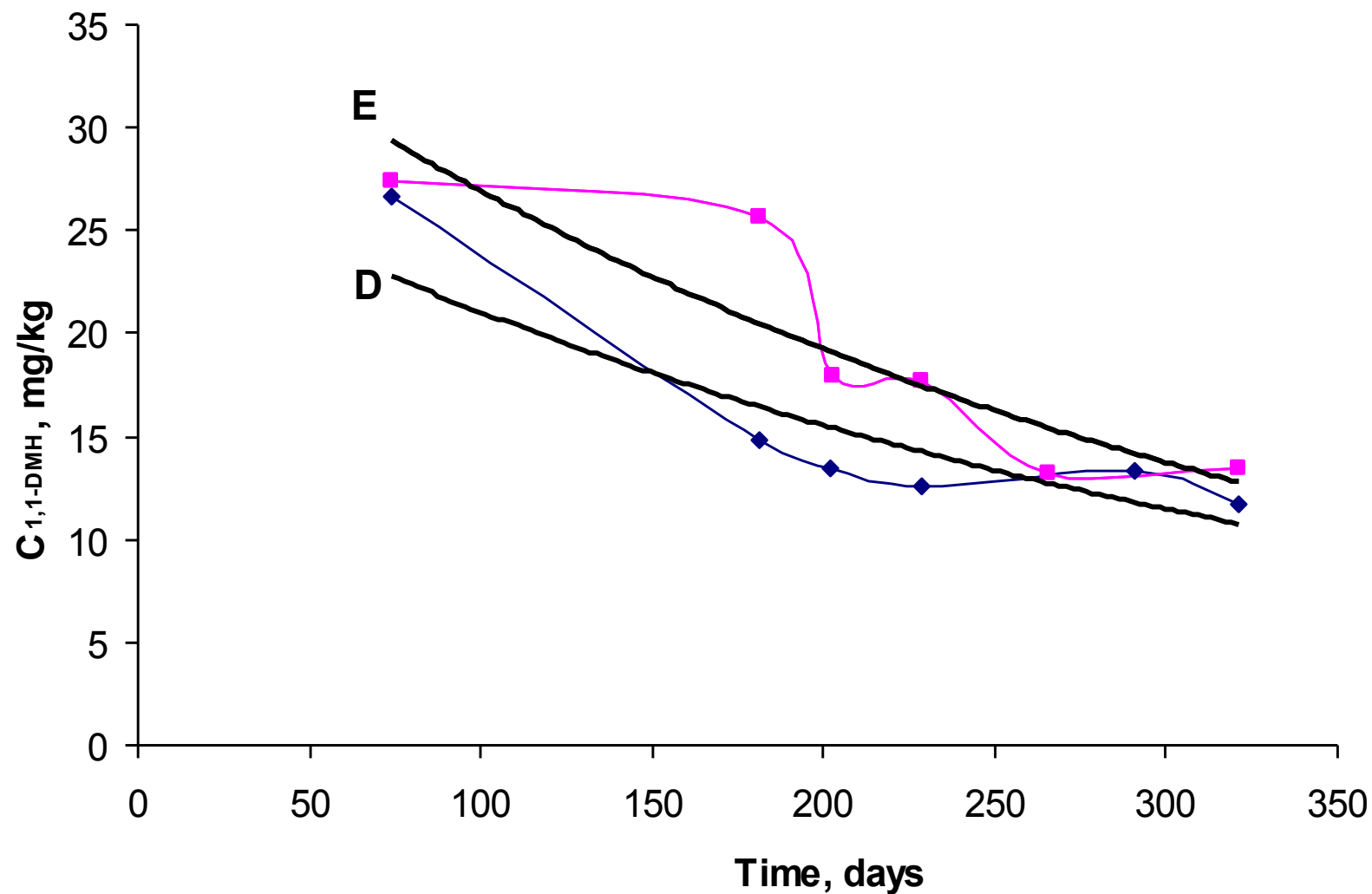


A - (0-6 cm) - Brown, dry, compact, a slightly porous crust. Effervesce with HCl.

B - (16-28 cm) - Dark-brown. Humid, compact, lumpy, weakly-rooted. Heavy loamy soil. Effervesce with HCl.

C - (28-38 cm) - Brown. Numerous spots of carbonates, humid, slightly compact, weakly rooted, clotted. Medium loamy. Effervesce with HCl

Kinetic curve of the dependency of 1,1-DMH destruction process on the type of soil



D - (38-70 cm) - Pale yellow-brown. Humid, compact, grussy-of fine grainy texture. Medium loam. Effervesce with HCl

E - (70-140 cm) - Pale yellow-brown. Humid, compact, structureless. Light loam. Effervesce with HCl