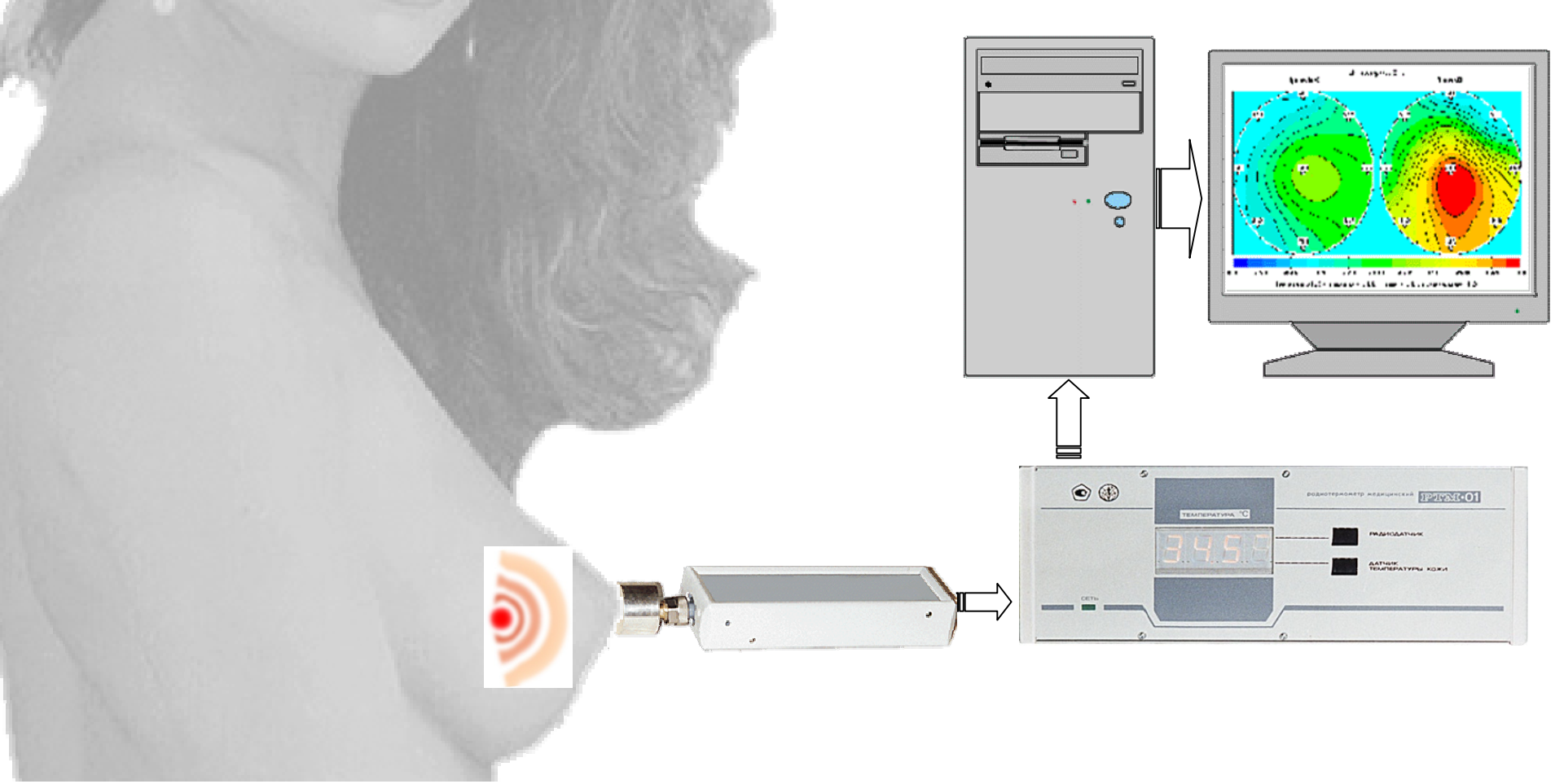
Microwave

Radiometry



The RTM-01-RES radiometer receives and evaluates the natural electromagnetic radiation (temperature) from the patient's internal tissues at microwave frequencies

Detection Methods

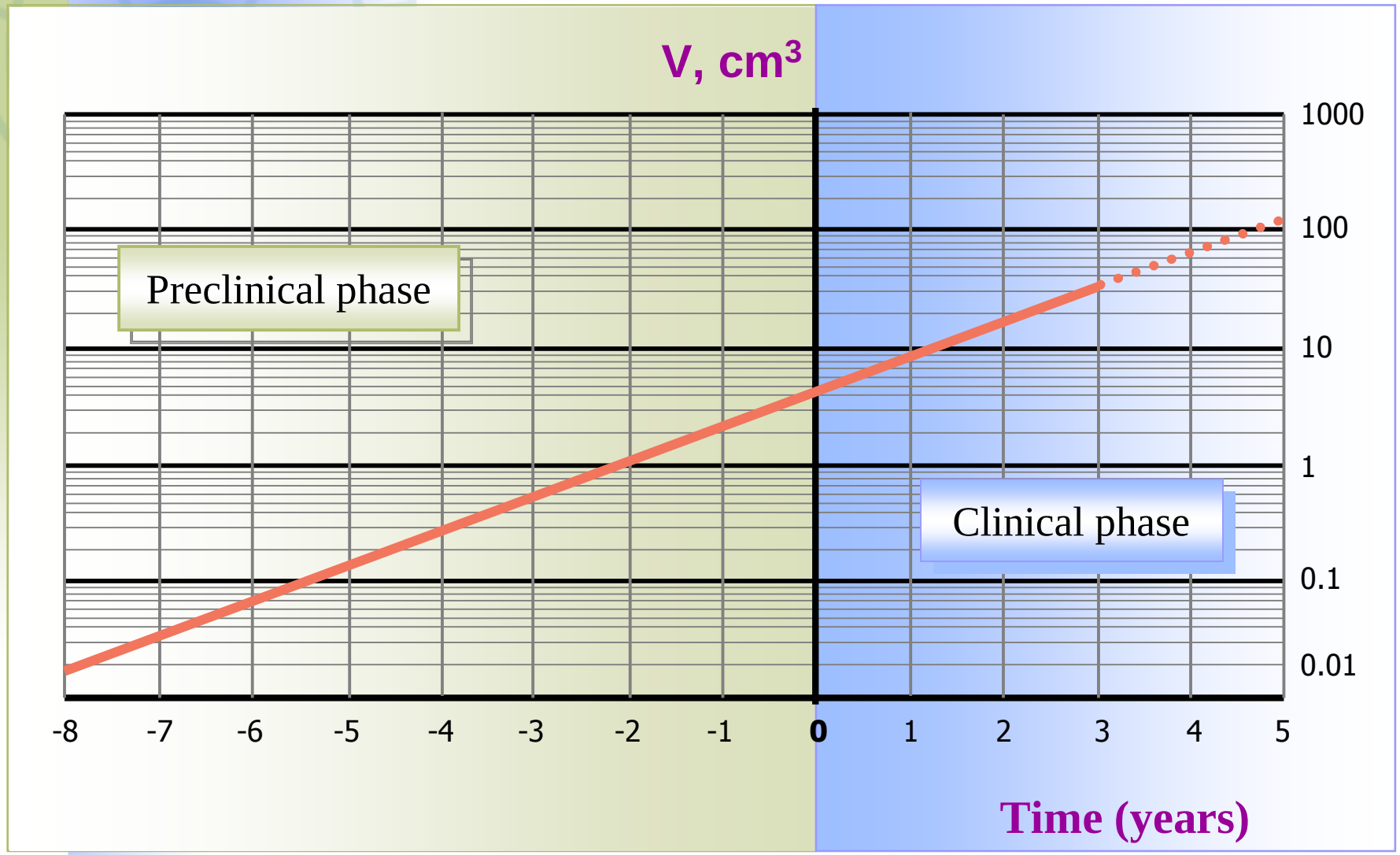
Oncological Disease Detection Methods

- Palpation
- X-ray examination
- Ultrasound
- Tomography
- Other physical methods

- Cytology
- Histology
- Cancer markers
- Biochemical Investigations

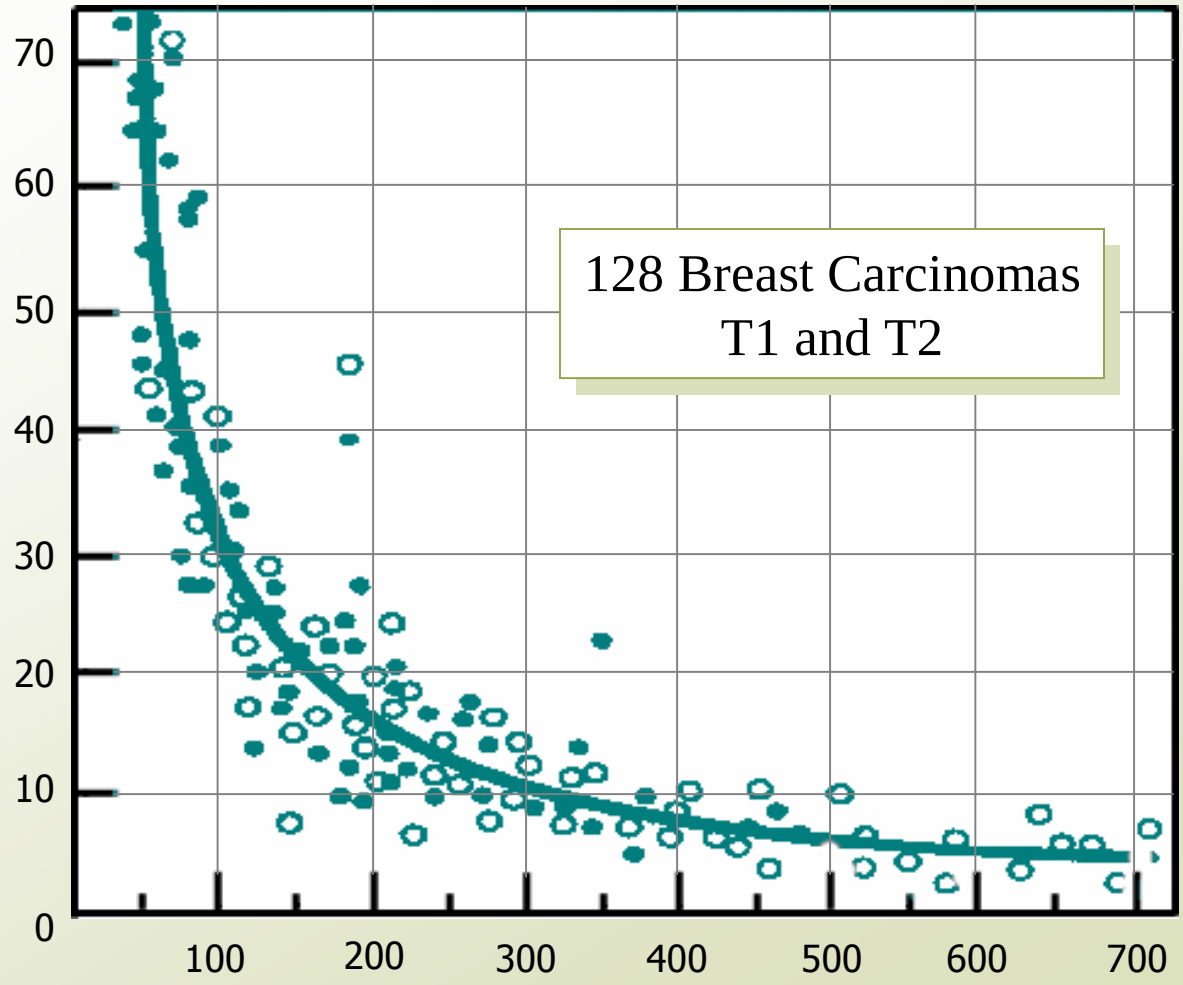
- Infrared thermography
- Microwave radiometry (RTM)

Kinetics of Tumor Growth



Growth Rate and Specific Heat Production of Breast Carcinomas

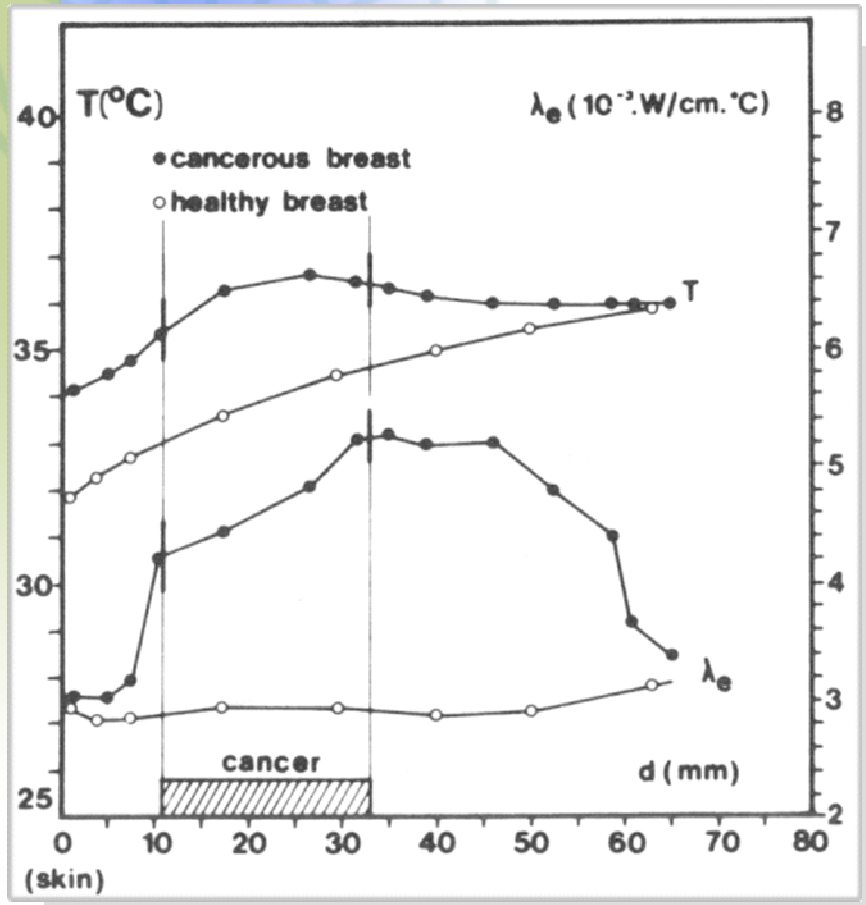
Metabolic Heat Production of Cancer Tissue q^* (10^{-3} W/cm^3)

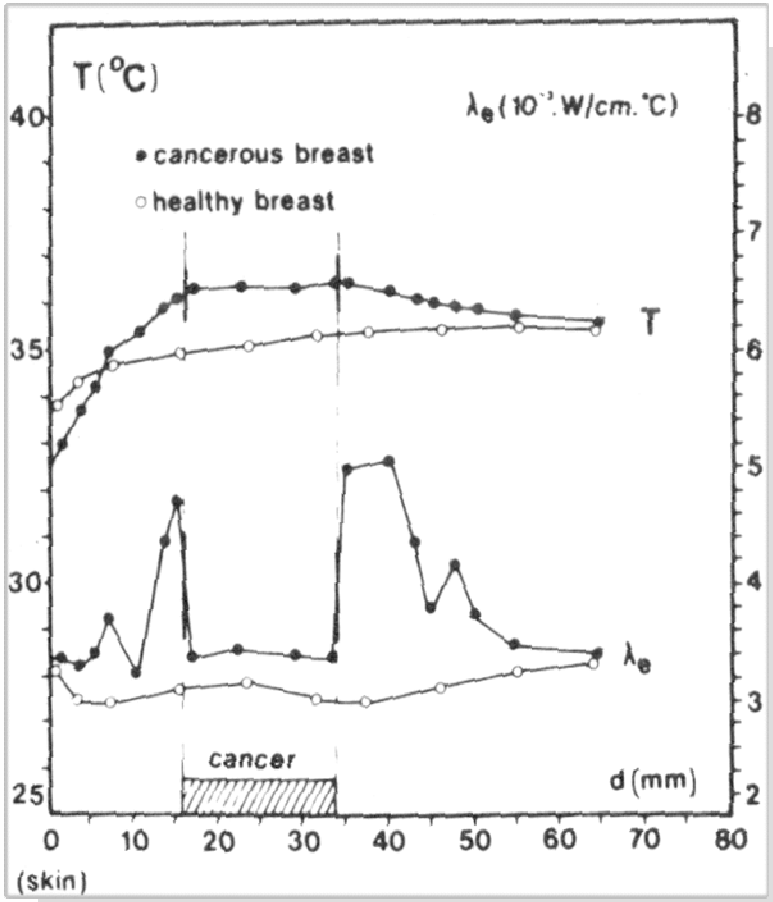


Doubling Time of Tumor Volume (days)

○	WITHOUT lymph node metastases
●	WITH lymph node metastases

Temperature Distribution

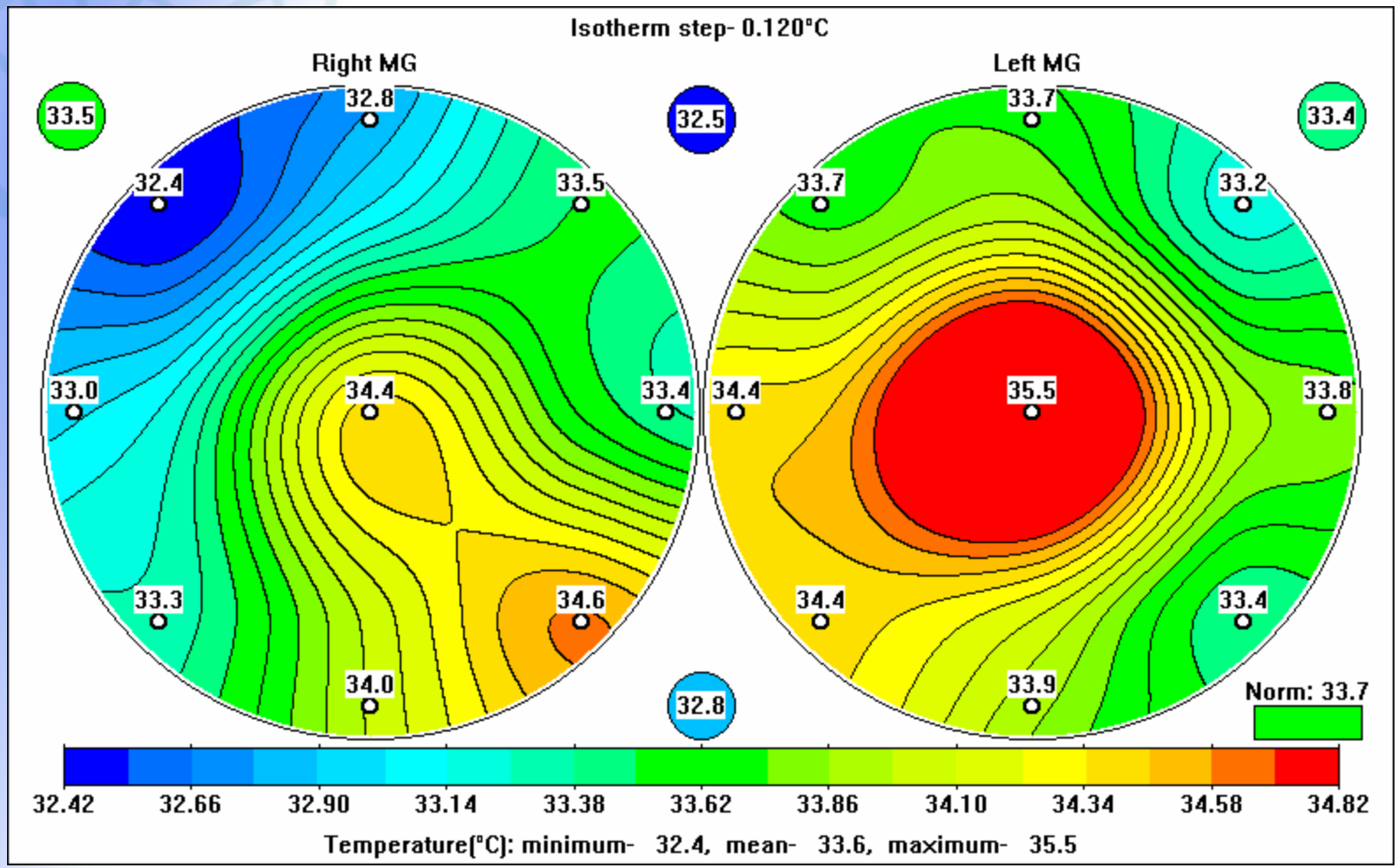




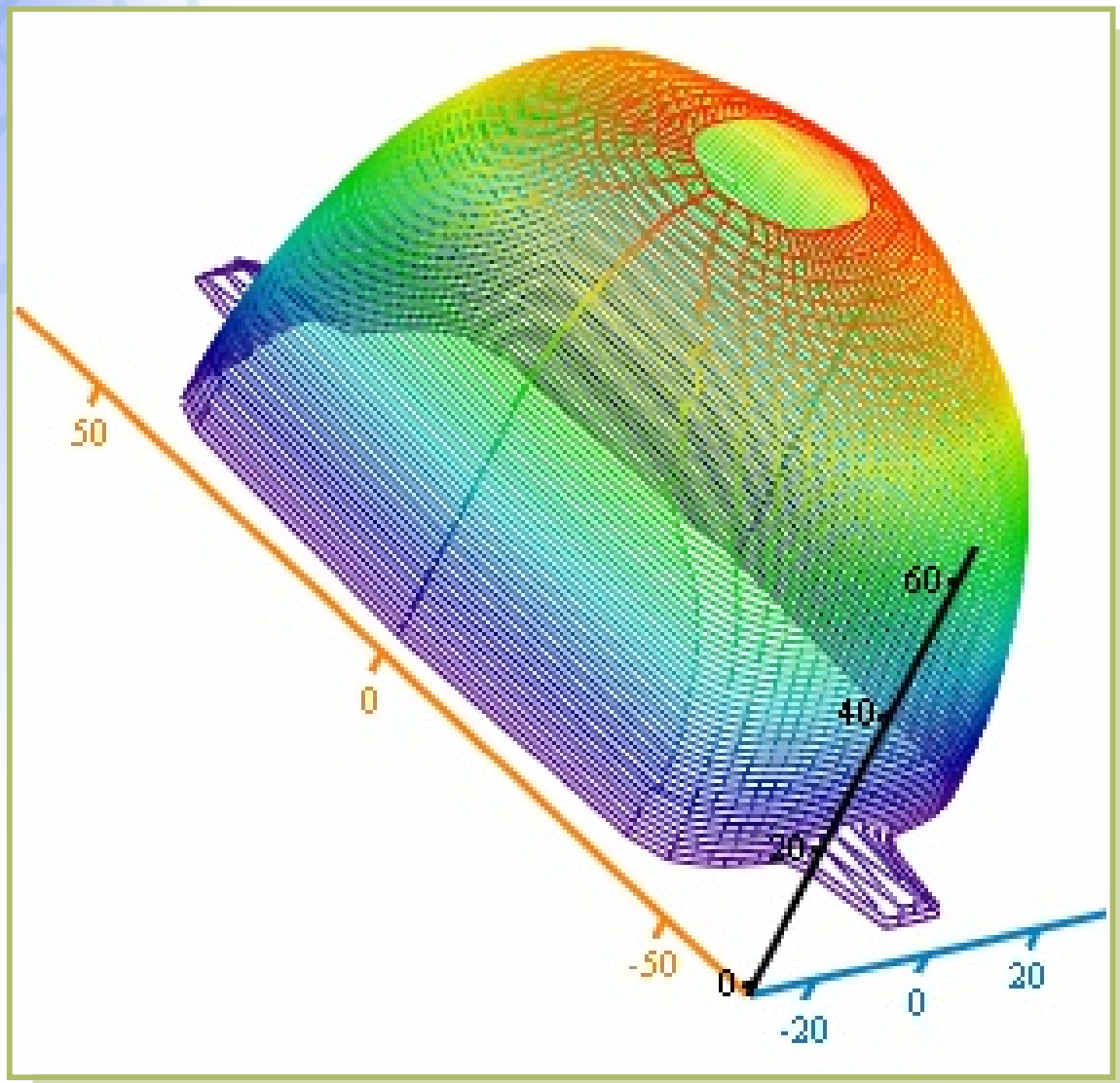
RTM – 01 – RES Imaging System

Items	Specifications
Thermal abnormality (i.e. a lower or higher temperature) is detected at a depth of, cm	**3 -7 (depending on water content tissue type)**
Accuracy of measuring the averaged internal temperature, when a temperature is 32 - 38 °C, °C	**± 0,2**
Time required for measuring internal temperature at a point, seconds	**6**
Antenna diameter, mm	**39**
Accuracy of measuring the skin temperature, °C	**± 0,2**
Time required for measuring skin temperature at a point, when the temperature is 32 - 38 °C, seconds	**1**
Device mass, kg	**4**
Power consumption, Watt	**20**

Breast Temperature Field

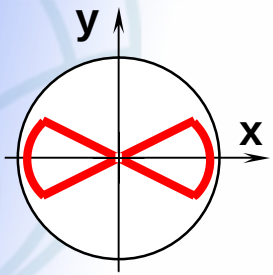


Antennas` Field

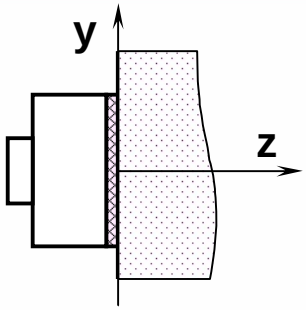


Cross Section of Antenna Diagram

a)



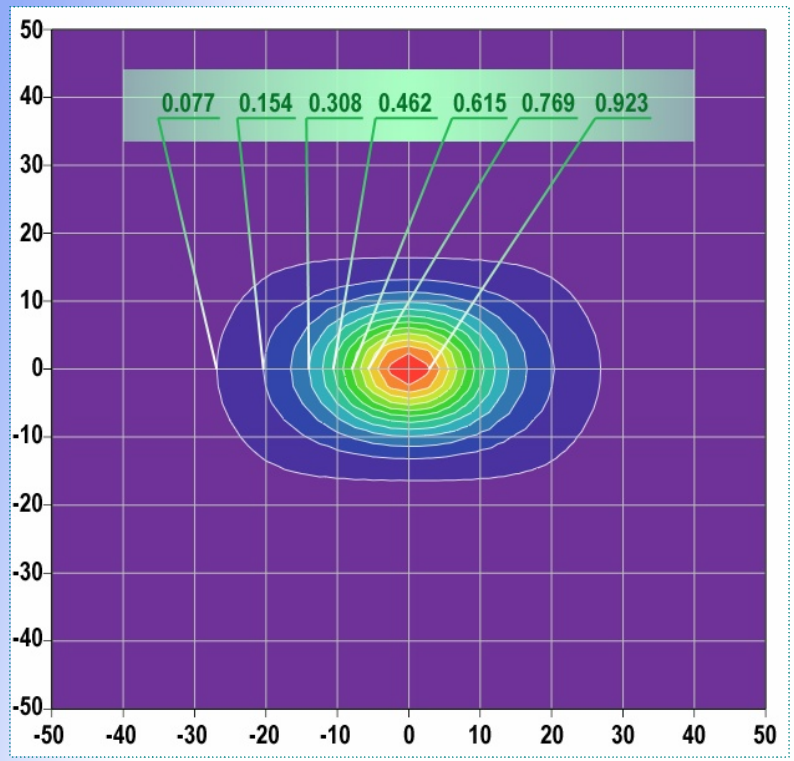
b)

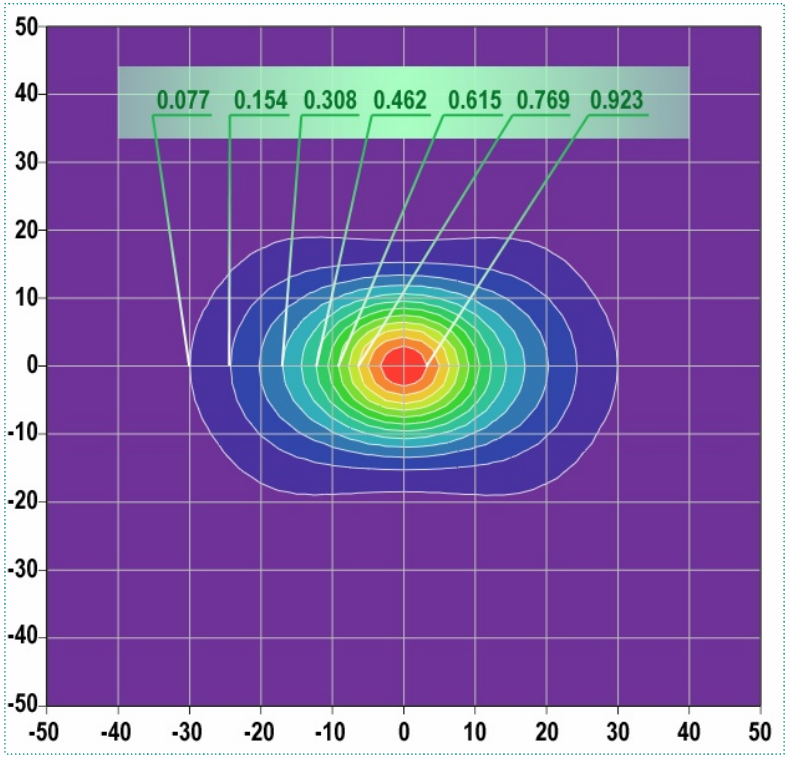


Z = 10 mm

D = 22 mm

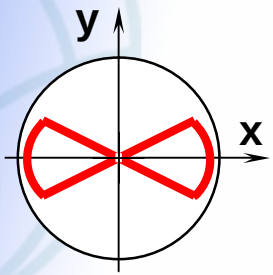
D = 38 mm



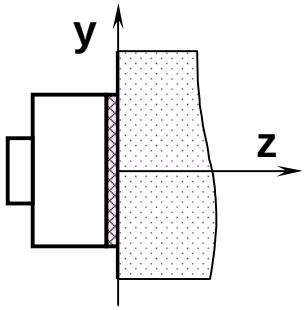


Cross Section of Antenna Diagram

a)

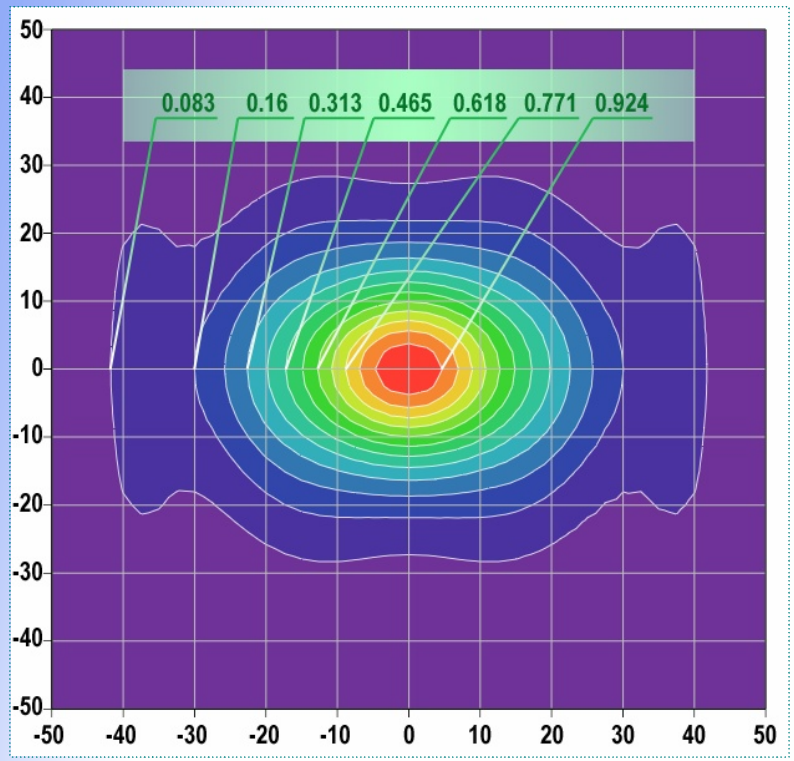


b)

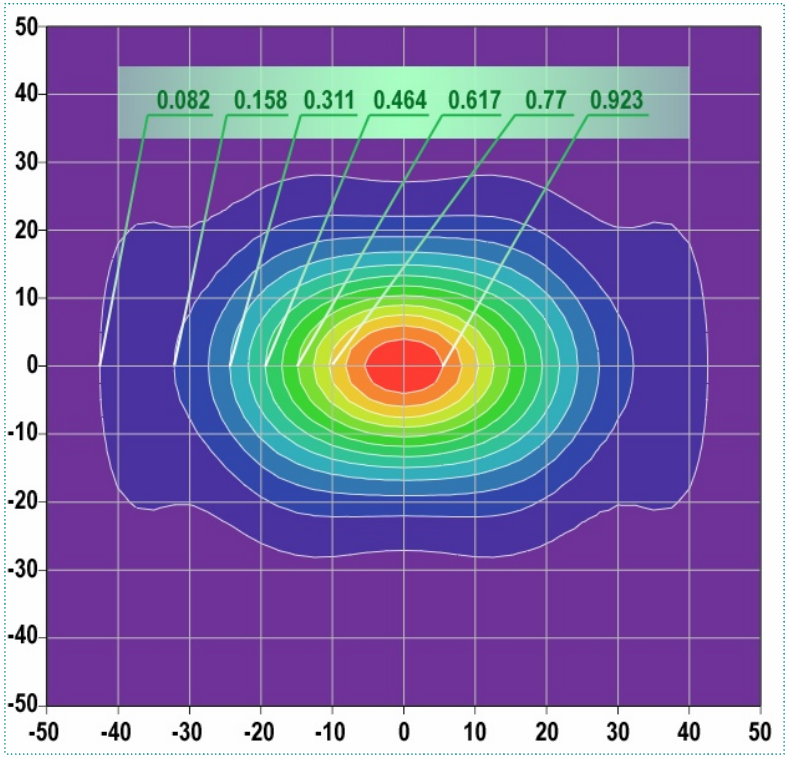


Z = 20 mm

D = 22 mm

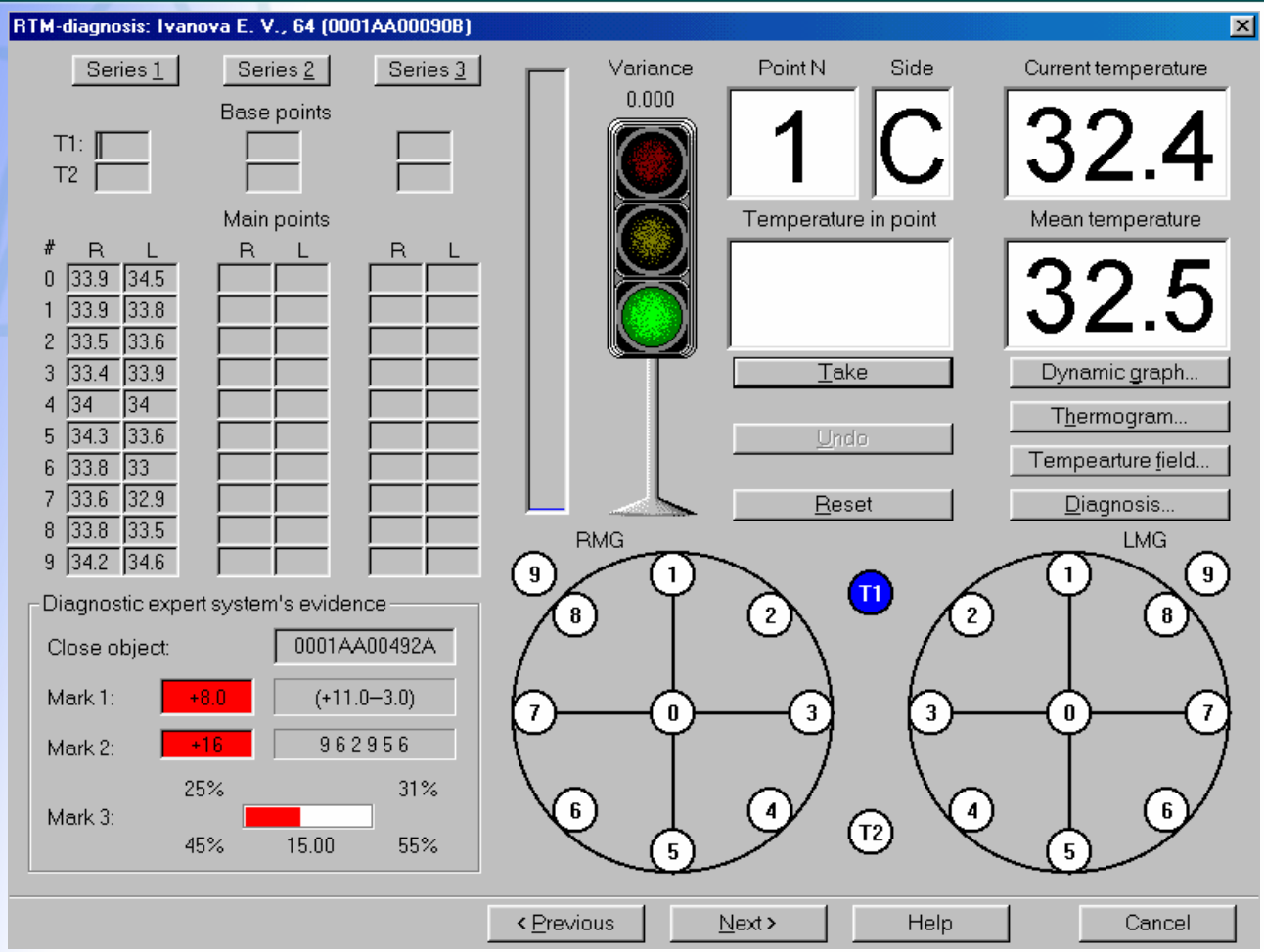


D = 38 mm



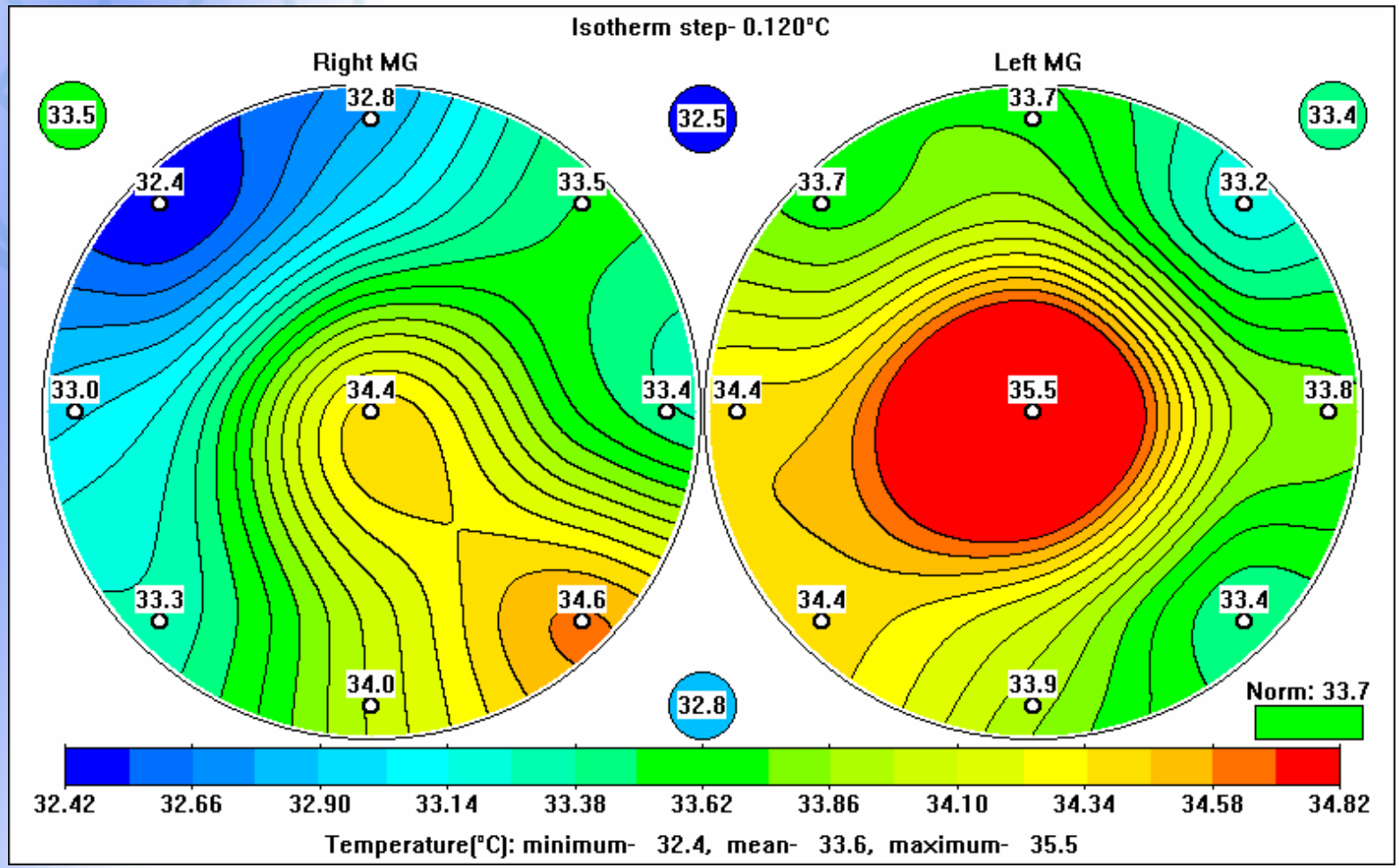
- **The efficacy of the method called “Breastscan” is confirmed by clinical trials, which were carried out among more then 3500 patients.**

RTM-Diagnosis Software



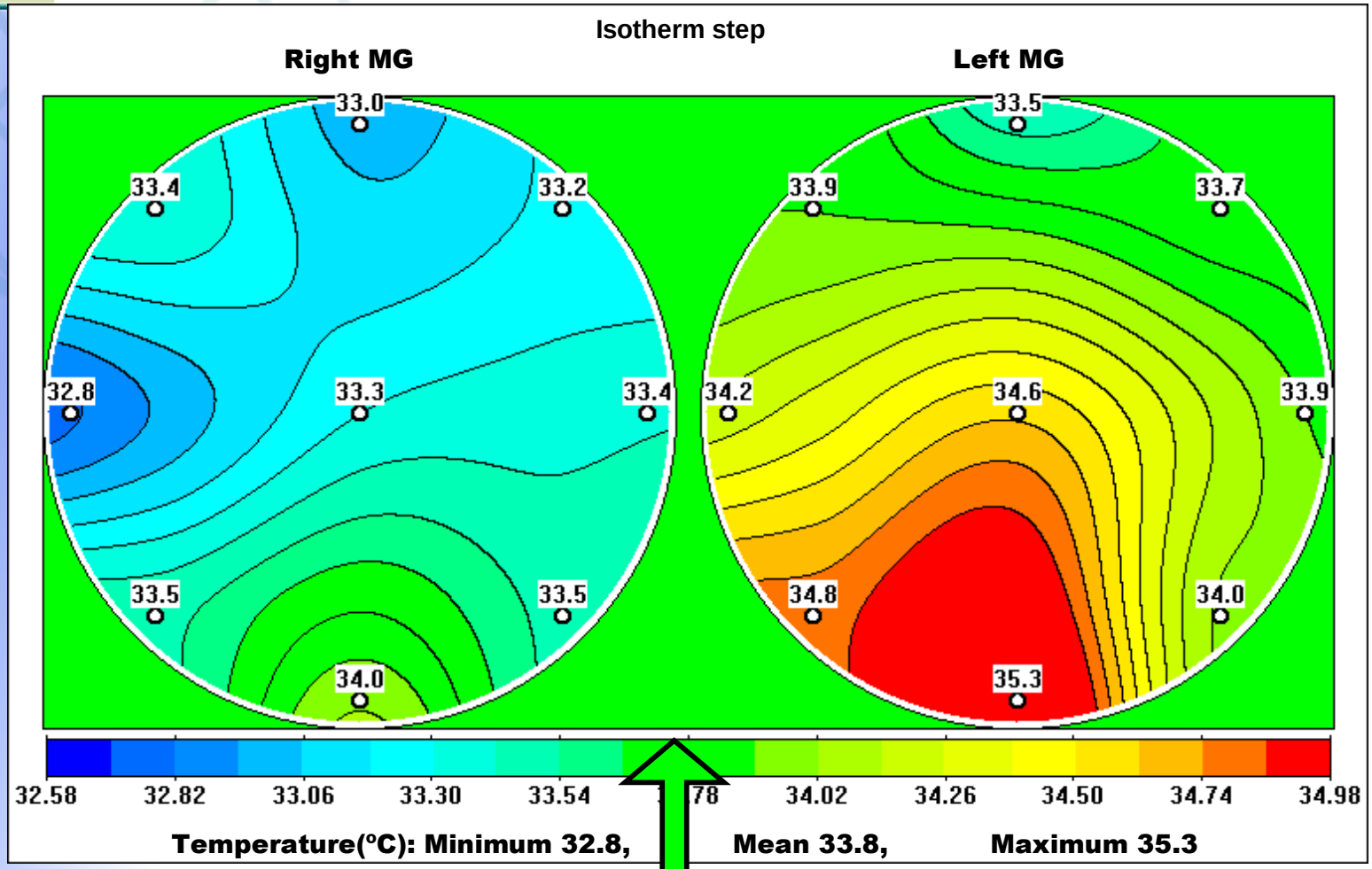
Data of the measured temperatures are automatically stored in the computers memory to be processed.

Breast Temperature Field



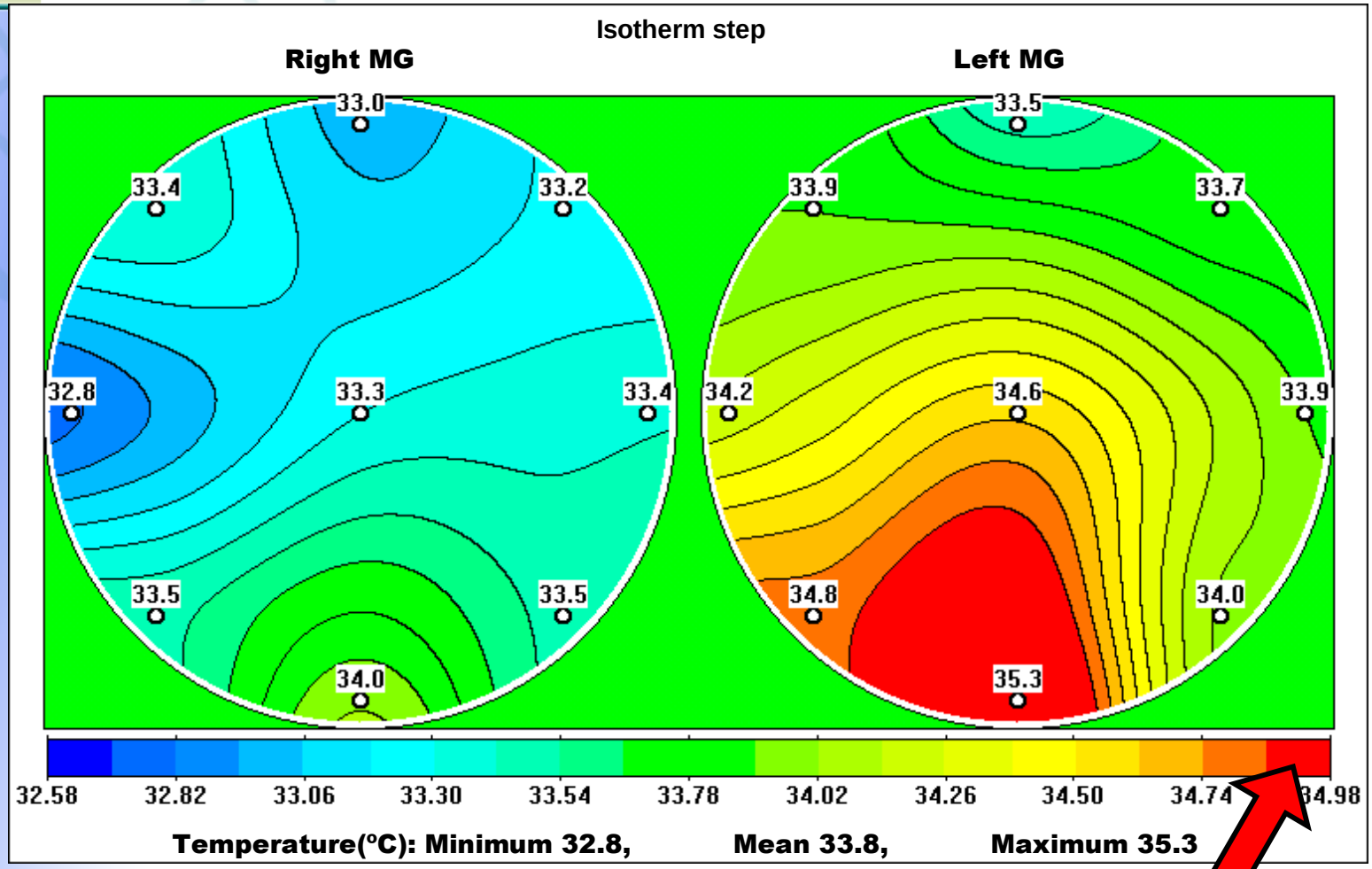
Results of the measurements can be displayed in different modes

Breast Temperature Field



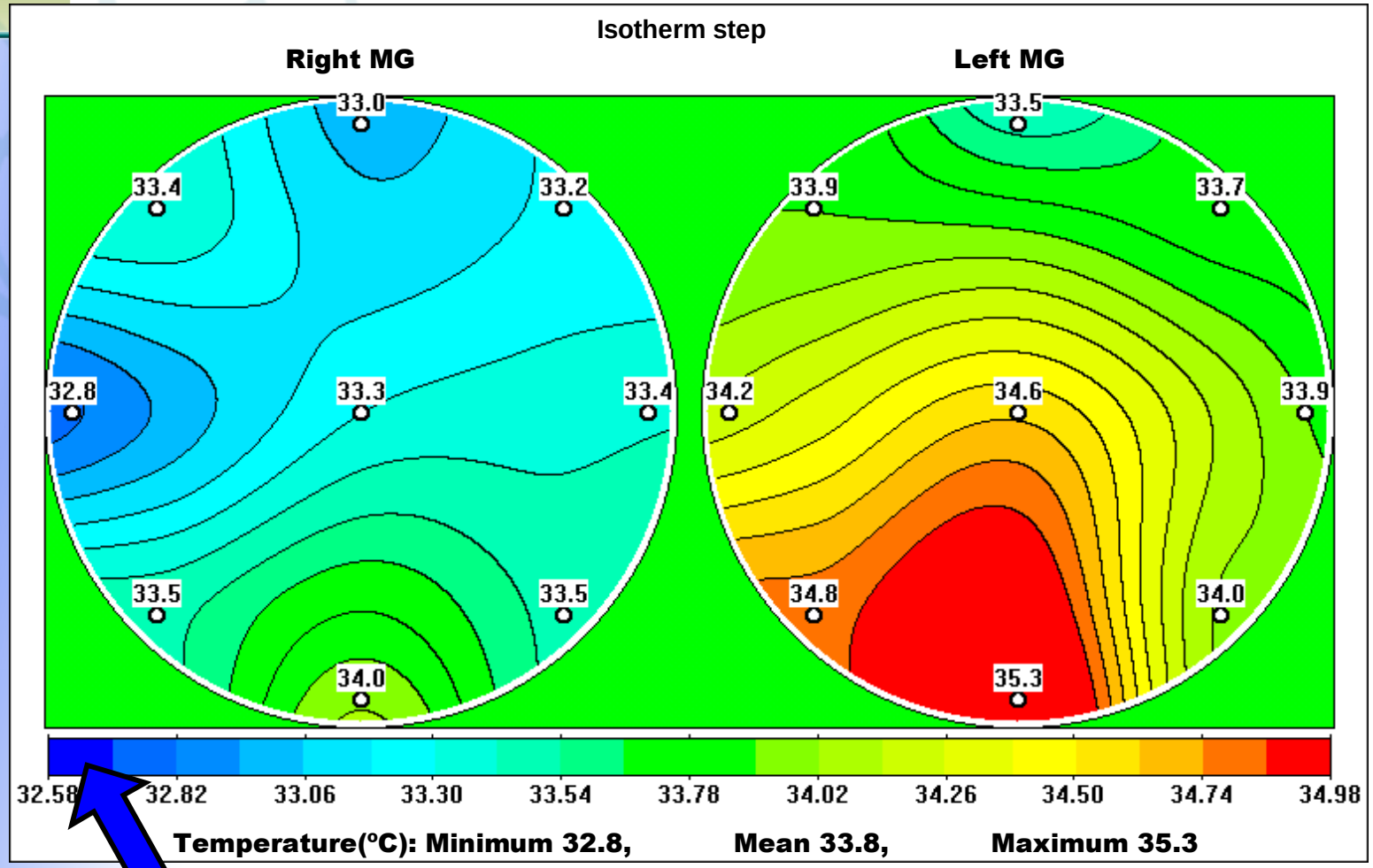
- The green colour represents the average temperature field of an examined organ

Breast Temperature Field



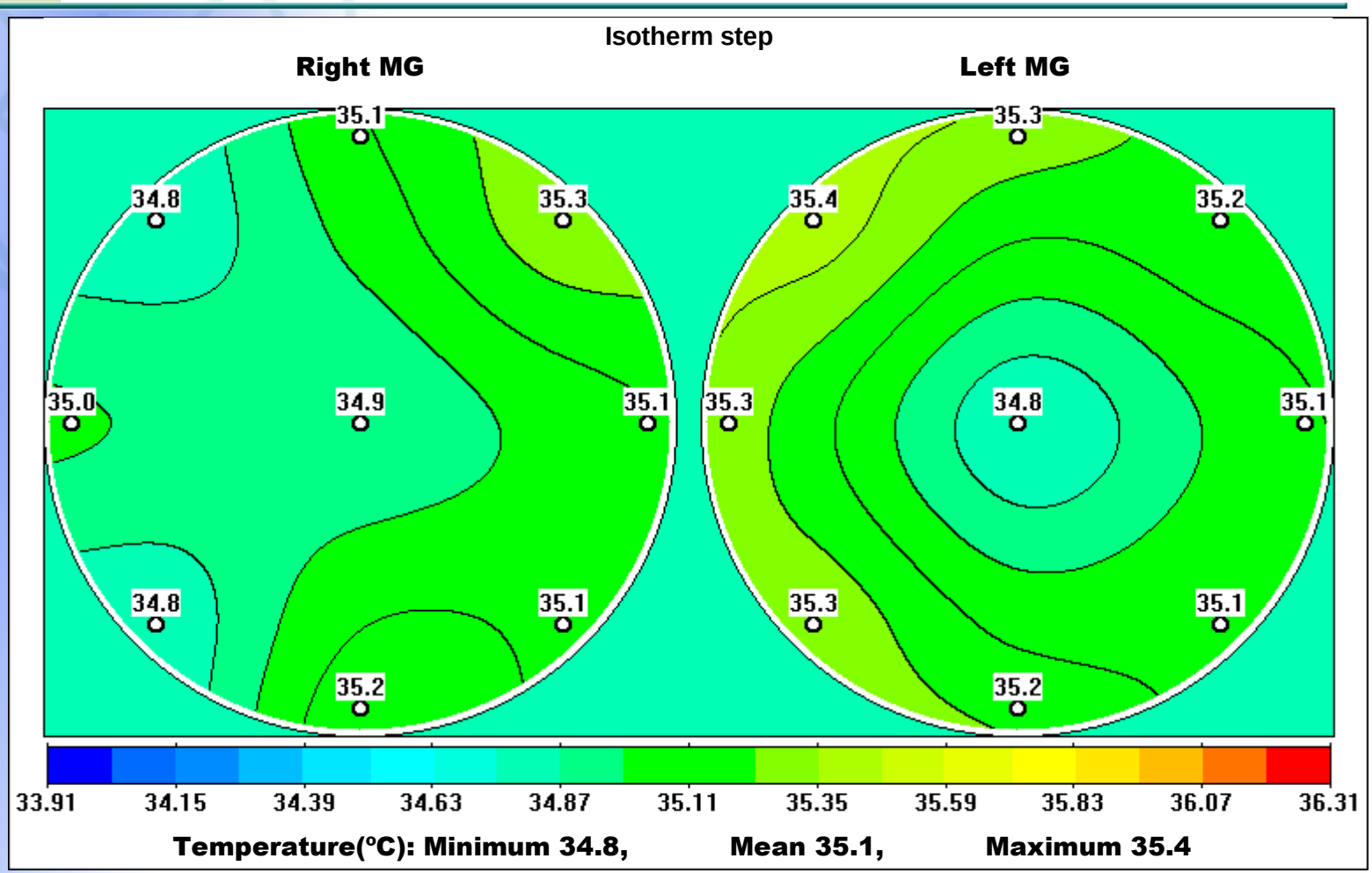
- The red colour represents a high temperature field of an examined organ

Breast Temperature Field



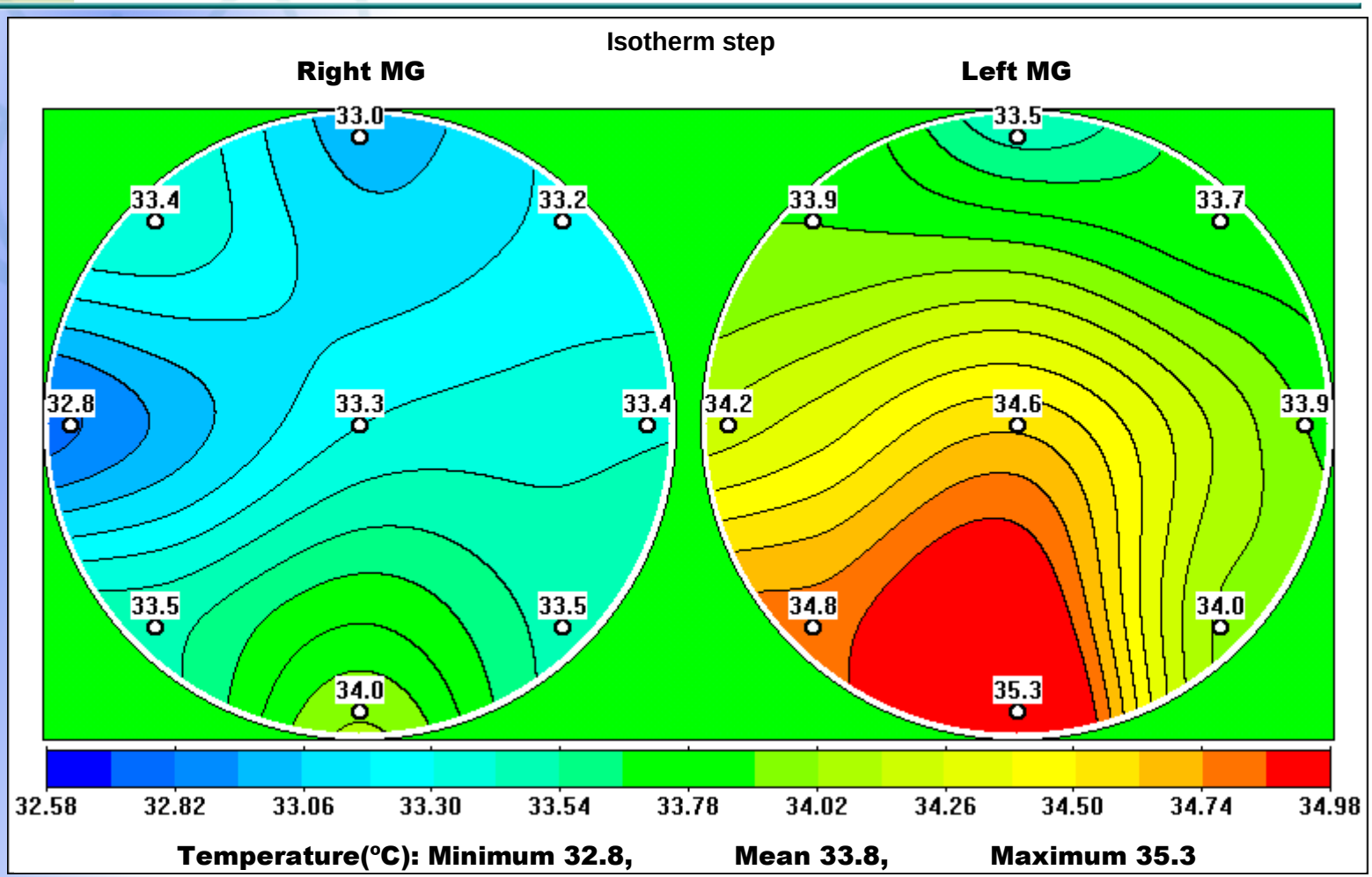
- The blue colour represents a lower than average normal temperature

Healthy Woman's Field



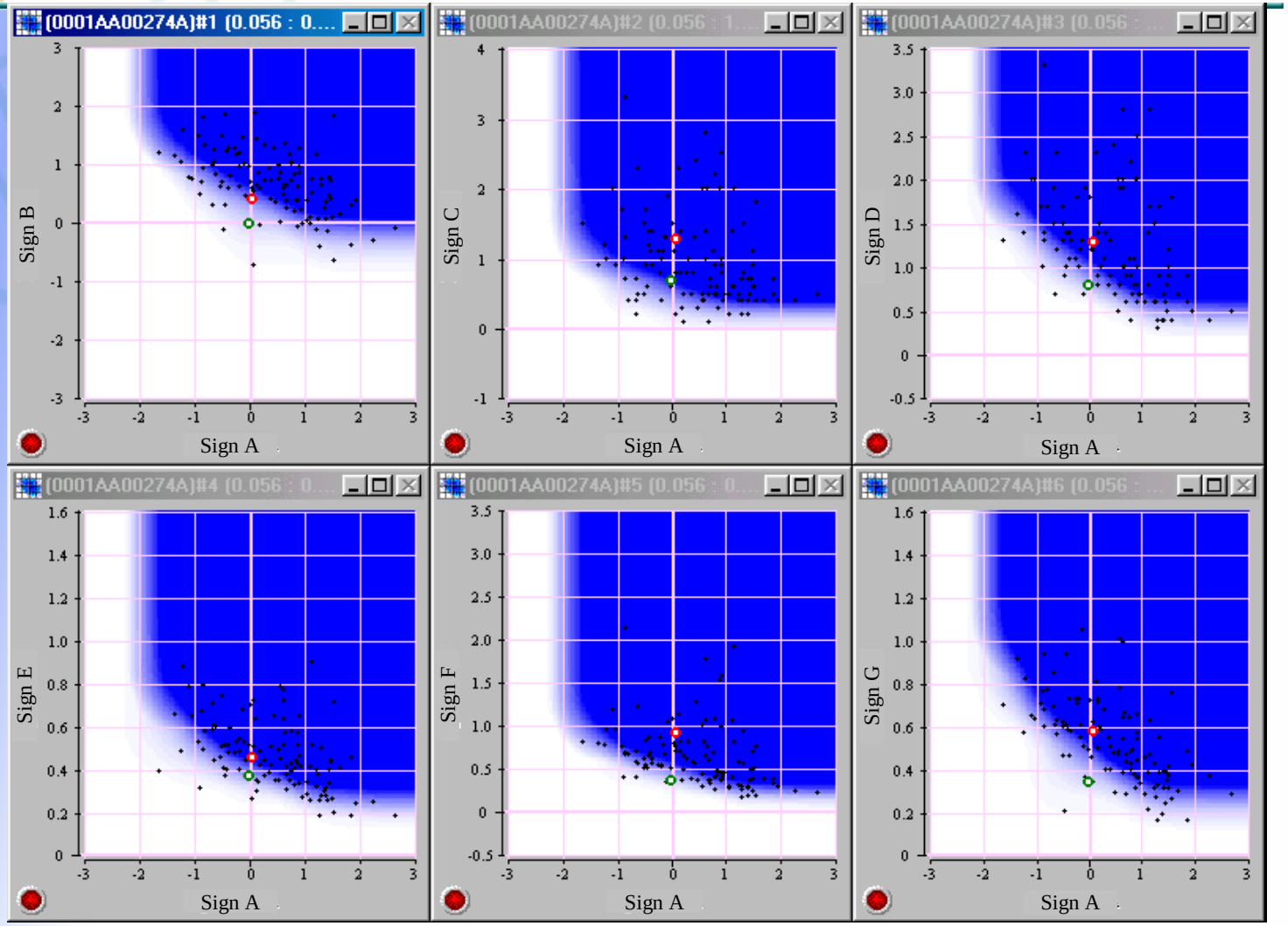
Example: This is the temperature field of a healthy woman's breasts.

Breast Temperature Field

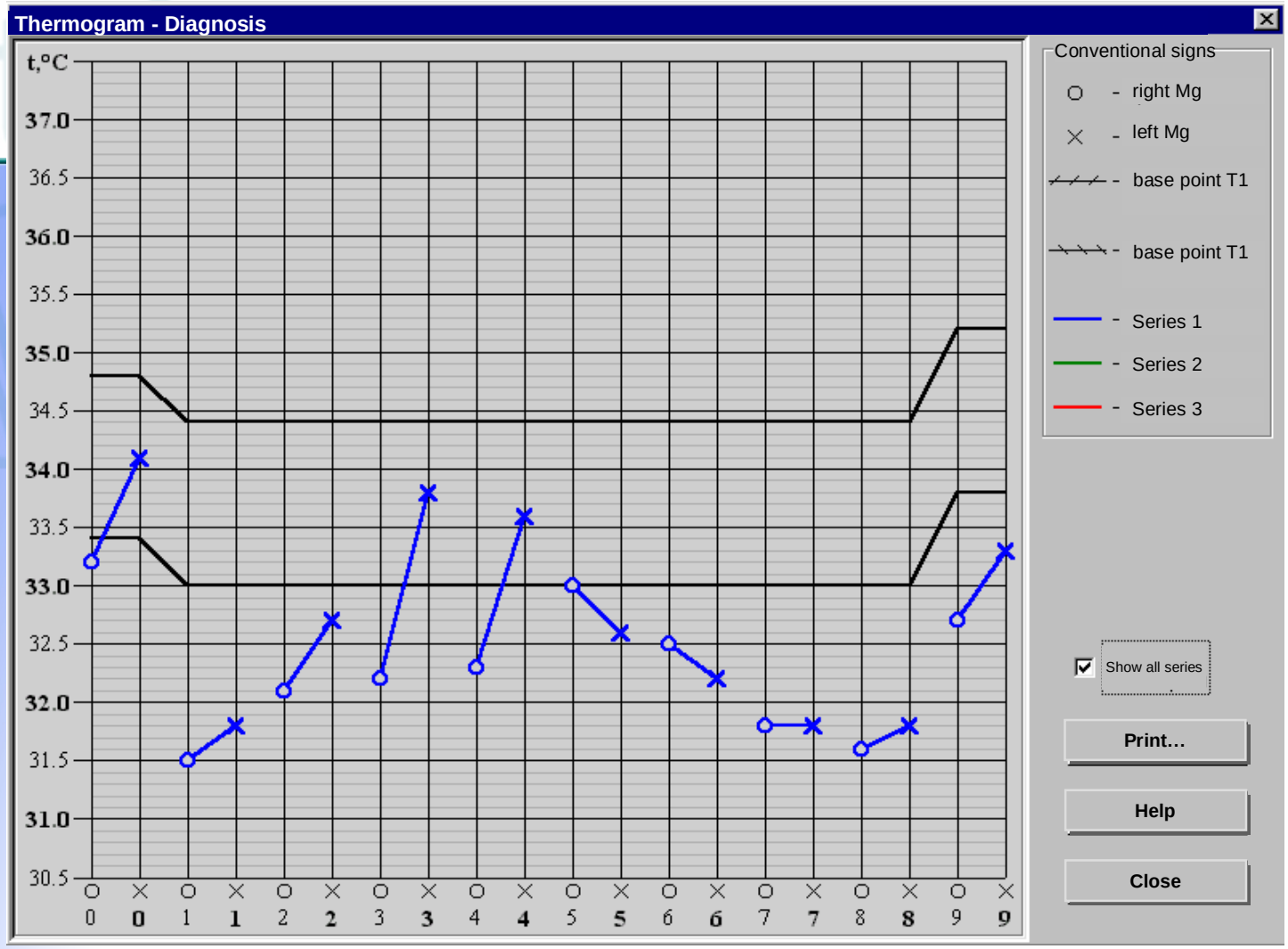


Many diseases (such as cancer) are represented by high temperature areas in the internal temperature field.

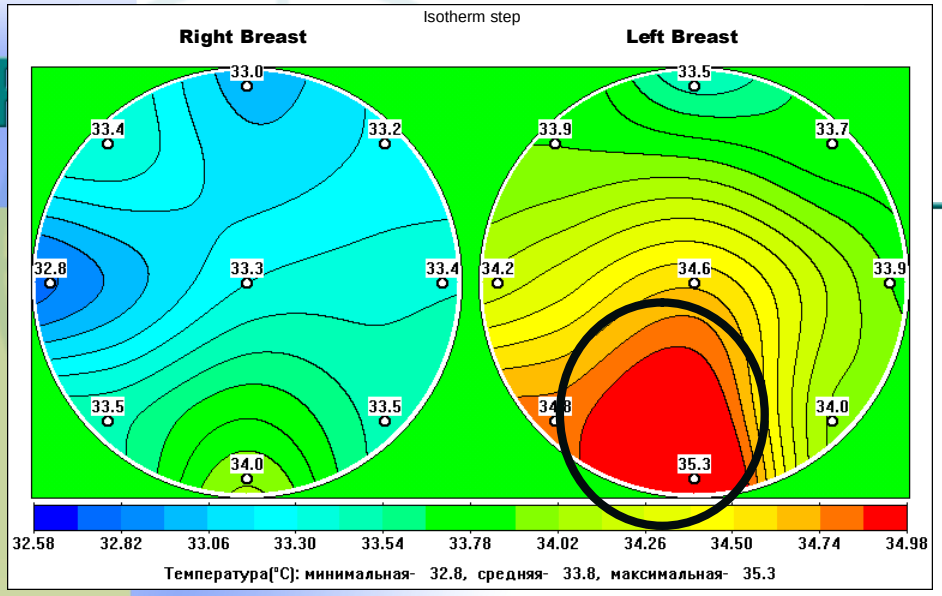
Expert System

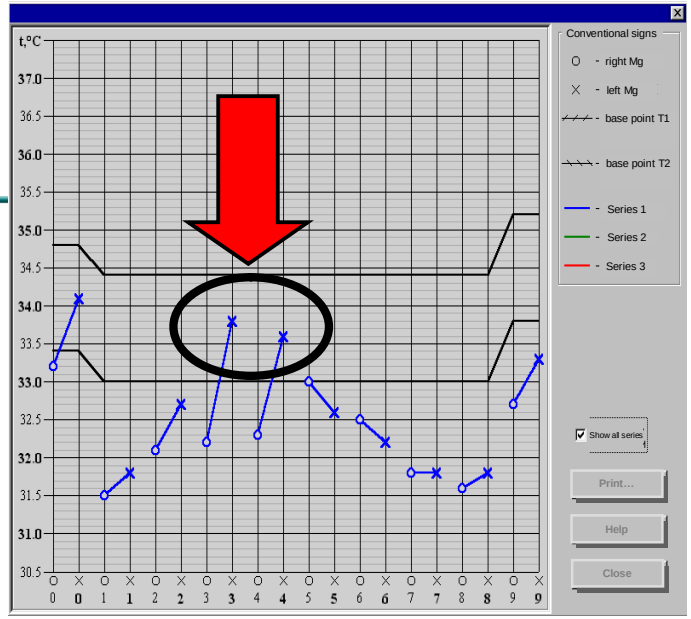


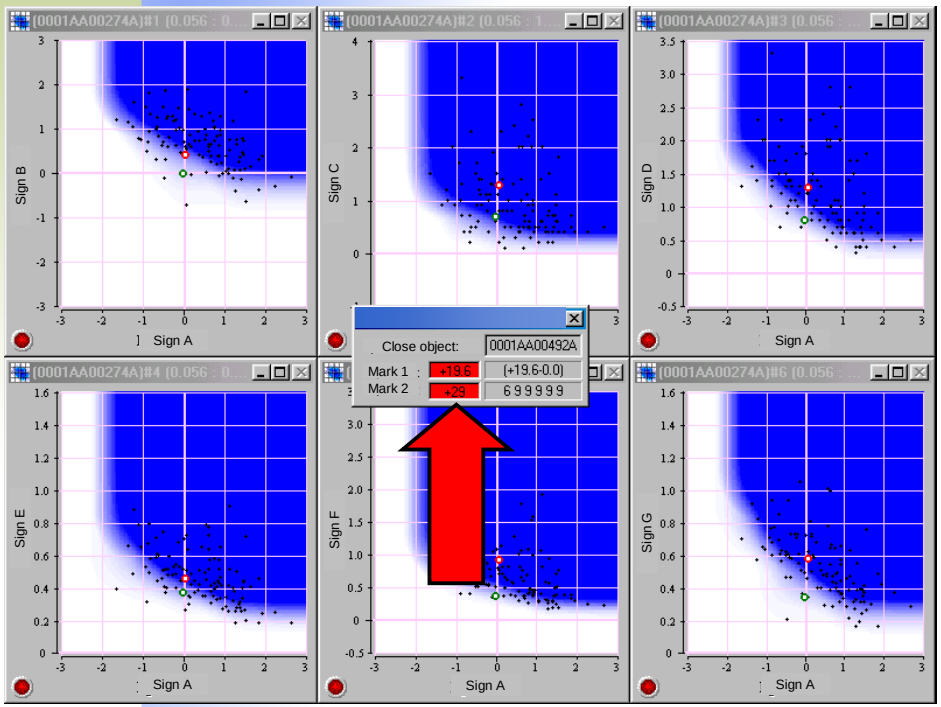
The software analyses whether an examined patient has features of cancer.



The results of the measurements may also be displayed as a thermogram. The fourth and the fifth points on the left breast are marked.





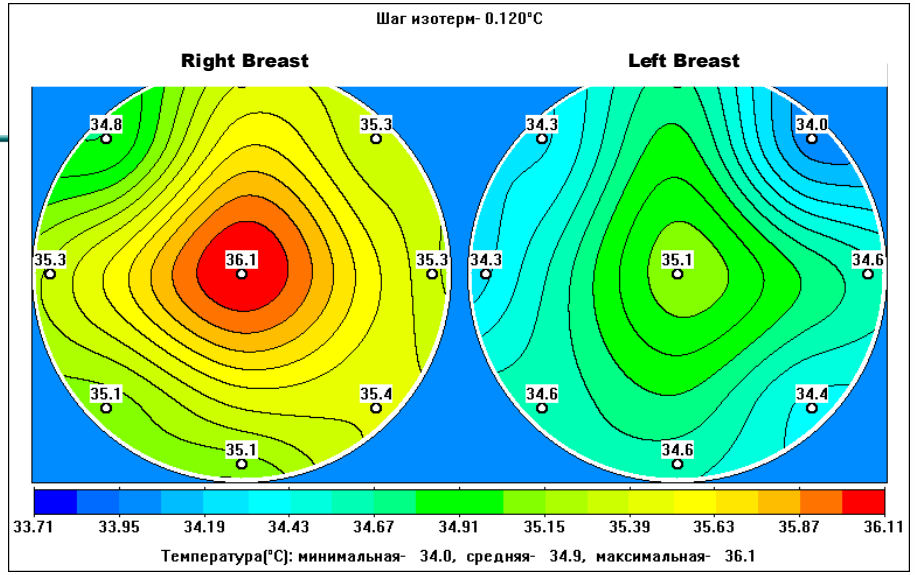


In this case there is an extremely high possibility that the examined patient has left breast cancer

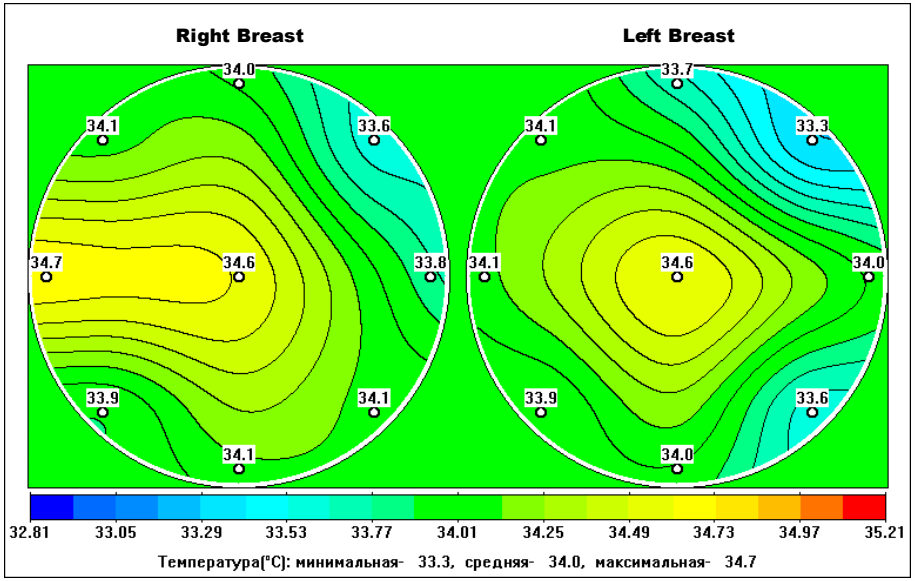
- The Breastscan is indispensable for the monitoring of treatment due to the fact that it is absolutely harmless.

- This is a sample of the positive dynamics which occur during the treatment of mastitis.

Patient B. (before treatment).

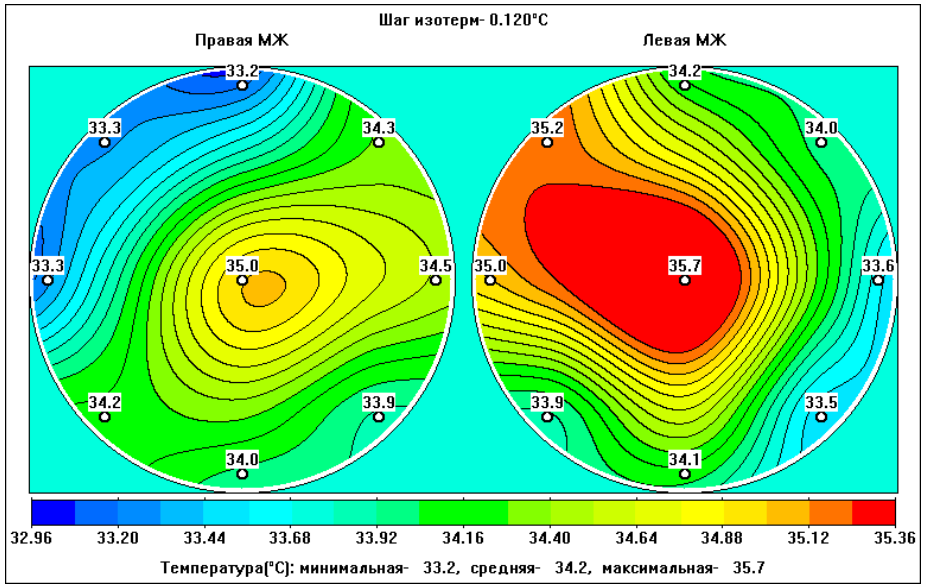


Patient B. (after treatment).



Patient K., 57 years old

During oncological processes thermal changes precede anatomical changes. The diagnostic method has a unique ability to detect cancer diseases at early stages, when the traditional methods can not detect diseases, which have just appeared.



Clinical diagnosis - both breasts have diffuse fibrocystic mastopathy, node neoplasm is not detected.

X-ray - fibrocystic mastopathy with fibrous features.

Puncture - erythrocytes, fat drops.

Clinical Trials Results